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A Summary of Current Program, 9/30/62  
and Preliminary Report of Progress  
for 10/1/60 to 9/30/62

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MARKETING ECONOMICS DIVISION  
of the  
ECONOMIC RESEARCH SERVICE  
UNITED STATES DEPARTMENT OF AGRICULTURE

This progress report of U.S.D.A. and cooperative research is primarily a tool for use of scientists and administrators in program coordination, development and evaluation; and for use of advisory committees in program review and development of recommendations for future research programs.

There is included under each problem area in the report a brief and very general statement on the nature of the research being conducted by the State Agricultural Experiment Stations and the professional manpower being devoted by the State stations to such research. Also included is a brief description of related work conducted by private organizations. No details on progress of State station or industry research are included except as such work is cooperative with U.S.D.A.

The summaries of progress on U.S.D.A. and cooperative research include some tentative results that have not been tested sufficiently to justify general release. Such findings, when adequately confirmed will be released promptly through established channels. Because of this, the report is not intended for publication and should not be referred to in literature citations. Copies are distributed only to members of Department staff, advisory committee members and others having a special interest in the development of public agricultural research programs.

This report also includes a list of publications reporting results of U.S.D.A. and cooperative research issued between October 1, 1960, and September 30, 1962. Current agricultural research findings are also published in the monthly U.S.D.A. publication, Farm Index. This progress report was compiled in the Marketing Economics Division, Economic Research Service, U. S. Department of Agriculture, Washington 25, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE  
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## INTRODUCTION

The marketing of farm products is a major U. S. industry. For food alone civilian expenditures for domestically produced commodities now total \$63 billion annually and are increasing steadily from year to year. The costs of marketing this food aggregate \$42 billion annually and the share received by farmers amounts to \$21 billion. In addition, the costs of marketing cotton, tobacco, and other nonfood products add significantly to the total marketing bill for agriculture as do the costs of handling exports.

The central function of the Division research program is to determine the reason for the changes that are taking place in marketing so that ways can be found to increase the efficiency of the marketing system and make it more responsive to changing public needs. This research covers all economic aspects of marketing from the time products leave the farm until they are purchased by ultimate consumers. It includes farmers' bargaining power; the economics of product quality and grade; market potentials for new products and new uses; market structure and practices; marketing costs, margins, and efficiency; economic effects of special programs such as school lunch, special milk, food stamp, and direct distribution; the effectiveness of merchandising and promotion in increasing the demand for farm products; impact of changing transportation legislation and practices on shippers of agricultural products; ways to improve market news and related information; and the possibilities of expanding industrial development in rural areas.

In addition to the major program of applied research, several basic studies are pursued concerning the forces underlying observed market phenomena.

The research of the Division is being carried on by a staff of about 175 professional employees. About 125 of these are in Washington, D. C. and the remainder are located at 29 field stations. Most of the field stations are at land-grant colleges with whom much of the Division's work is conducted cooperatively. Fifty-four cooperative agreements or similar understandings between the Division and land-grant colleges or other institutions were operative during the past year.

Part of the research of the Division is conducted by contract with other organizations. Twenty-seven contracts were in progress or completed during the past year. Also during the year the Division received trust funds from three nongovernmental associations, and fund transfers under arrangements with other Federal agencies in six cases to defray the costs of special research studies undertaken. In addition to these formal arrangements the Division has many other contacts with private marketing firms and associations and with other research groups. It participates, for example, in the planning and review of marketing research being conducted by over 20 regional groups of land-grant colleges.

Despite the extent of the Division program there are a number of subjects and problems which are not being examined adequately because of staff



shortages or analytical difficulties yet to be resolved. Nevertheless, several noteworthy studies were completed during the reporting period. Some of these are as follows:

1. Federal Lamb Grades Found Desirable: -- The Department of Agriculture, in cooperation with representatives of the sheep and lamb industry, developed a revised set of Federal grades for lamb and made them effective in March 1960. In response to a request from the House of Representatives Committee on Agriculture, a study of the effects of this change, and the role of Federal grades for lamb in general was initiated by the Division. No support was found for the view expressed by certain industry groups in 1959 that Federal lamb grades were hurting rather than helping producers. The 1958-61 lamb price decline was principally caused by the high production of lamb and substitute meats. There is no evidence that Federal grades were a factor. On the contrary, their impact on lamb marketing is important and positive. They promote competition by helping the small firms compete with the large. They lower marketing costs. They help encourage production of desirable types of lambs. They help consumers consistently find the kind of lamb they prefer.

2. Basis Provided For Revision of Peanut Price Support Differentials:-- Results of an intensive study of economic factors underlying price support differentials for the four principal types of farmers' stock peanuts provided the basis for revision of the differentials recommended by a special industry advisory committee, and adopted by the Department, for the 1962 crop. The study, based mainly on trends in peanut shellers' operating margins, geographic movements, and end-product uses, indicated the direction and magnitude of desirable changes in the price differentials under the peanut price support program.

3. Research Indicates Prospects of Lowering Marketing Margins For Bread:-- A study of the baking industry completed during the past year shows that technological improvements such as oven firing, automatic handling and continuous dough mixing make possible significant reductions in the cost of producing bread.

To fully realize such economies the volume of output per plant needs to be increased. Thus it was determined that plants producing 2,000 pounds of bread per hour with standard equipment and operating 36 hours a week might have production costs of between 11 and 12 cents per pound loaf whereas bakeries producing 8,000 pounds per hour, using improved equipment and operating 108 hours per week might expect costs of between 6 and 7 cents per pound loaf. It also was discovered that economies in distribution can be achieved with possible savings of 3 to 4 cents per pound loaf. The reality of these prospective economies is suggested by the achievements of some of the food chains which have acquired their own baking plants or have longer-term purchase commitments with particular suppliers. Some of these organizations recently have reduced retail prices of bread by as much as 5 cents per pound loaf below the U. S. average.

4. Consequences of Pilot Food Stamp Plan Assessed: -- Following a Presidential request in early 1961, the Department inaugurated a series of pilot food stamp projects to test the effectiveness of this method in

improving nutrition and more effectively using our productive capacity. To test the consequences of these pilot projects this Division conducted surveys of consumers and of retail stores in several of the pilot areas both before and after the initiation of the projects. These surveys indicated that the stamp program was an efficient way to increase food consumption among needy participants, particularly of the so-called "protective foods" such as meat, poultry, dairy products, fruits, and vegetables. Overall food purchases rose about 7 percent after the initiation of the plan in the particular areas studied.

The results of this investigation were of particular value in planning the extension of the food stamp plan which was inaugurated in the summer of 1962.

5. Marketing Apples in New Form Found Economically Feasible: -- The commercial possibilities of dehydrofrozen apple slices appear to be excellent in the baking industry. This commercial appeal arises from the fact that dehydrofrozen apples, with 50 percent of the weight and volume removed, compare favorably in quality with regularly frozen apples, yet incorporate some of the economic advantages of dehydrated products, such as savings in handling and shipping costs.

These results were obtained from extensive field surveys conducted during the year with bakers, brokers, and fruit processors. Favorable baker reaction was found, especially in large institutional and wholesale bakery operations where savings in transportation and storage are substantial. Today, there are at least eight commercial processors of dehydrofrozen apple slices, and others are investigating the possibilities, anticipating production. In addition, several national and regional chains have adopted this new product in their baking operations.

6. Appraisal of Rural Area Development Possibilities. -- The Division is giving substantially increased attention to appraisals of the economic feasibility of various types of off-farm employment opportunities in low-income rural areas. For example, a study is now underway concerning the feasibility of establishing several kinds of agricultural processing plants in Alaska. Another study concerning the economic basis for constructing a wool scouring plant in a producing area has been completed. The need for properly blending wool before scouring was pointed out as an important difficulty which the proposed plant would face. An additional investigation concerning the establishing of new livestock slaughtering plants in the southeast indicated that in many instances an expansion in slaughter at existing plants would be a more economical way to handle larger numbers of animals than the construction of new plants. Other studies completed concerned the pelleting of hay, a new plant for the production of corn oil and related products, and several relating to the processing of various fruits and vegetables. The investigations were requested by those responsible for loans under the Area Redevelopment Act as an aid in their action decisions.

In the following sections of this report, the eight major areas of work being developed by the Division are discussed, progress is indicated, and publications during the reporting period are listed.

## AREA 1 DISTRIBUTION PROGRAMS

Problem. During 1961-62 approximately one of every six persons in the United States participated in food distribution programs of the U. S. Department of Agriculture. Nearly \$700 million was expended in support of the Direct Distribution, Food Stamp, National School Lunch, and Special Milk Programs. These domestic programs serve to create an expanded outlet for agricultural products which represents a constructive utilization of agriculture's abundant resources.

There is continuing need for research which will facilitate expanded usage and nutritional objectives. Basic information concerning consumption, markets and distribution contribute toward implementing new or modified public programs. Information relating to program effectiveness, and the potential impact of present or alternative programs upon markets for agricultural commodities, prices and farm income provides guidelines for administrators and others concerned with policy determination and operational efficiency.

### USDA PROGRAM

The Department has a continuing long-term program involving agricultural economists, alone or with the cooperation of human nutritionists and program specialists, engaged in development of basic and applied information contributing to development and operation of effective public food distribution programs. Aside from one cooperative project with the Minnesota Agricultural Experiment Station, all work is being carried on in Washington, D. C.

The Federal scientific effort devoted to research in this area totals 9.2 professional man-years. Of this number, 8.0 is devoted to evaluation of food stamp and direct distribution programs; .9 to school lunch programs; .1 to special milk programs; less than .1 to away-from-home eating; and .2 to program leadership.

### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

In 1961 State Experiment Stations reported a total of 1.8 professional man-years devoted to evaluation of distribution programs. Of this total, 1.4 man-years were spent in analyzing phases of the Special Milk Program (Illinois, Minnesota, Alabama and Maryland). The balance of .4 man-years was spent in studies of school lunch, food stamp and allotment programs (California, Wyoming and Wisconsin).

Trade associations and private firms tend to rely upon public information concerning distribution programs in drawing inferences relating to their fields of interest. Basic information concerning food consumption, markets, and distribution is of mutual interest to the Department and the trade, and some research in this field is initiated by the trade--but infrequently are results released for public use. In 1961, it was estimated that such research effort did not exceed five man-years.

Universities, other than Land Grant Colleges, and research foundations have done limited work in this field. However, research tends to focus upon



broad policy problems rather than the instruments for carrying out such policy. It was estimated that this research effort was not in excess of five man-years during 1961.

## REPORT OF PROGRESS FOR USDA AND COOPERATIVE PROGRAMS

### A. Food Stamp and Direct Distribution Programs

A comprehensive program of research is being conducted to determine the effectiveness of the pilot Food Stamp Program in improving diets of low-income families, expanding agricultural markets, and obtaining optimum participation by eligible persons, and evaluating the impact of the Program on retail food store sales. Information has contributed to policy determinations and planning of operational procedures which will be tested in new pilot areas among the 25 authorized under the expanded Food Stamp Program. Related research aims to provide similar type information concerning commodity distribution to needy families under the Direct Distribution Program.

1. Household food consumption surveys involving over 1,400 families were conducted during 1961 in Detroit, Michigan, and urban and rural portions of Fayette County, Pa., before and after initiation of the pilot Food Stamp Program. Findings from these surveys indicated that the Program resulted in expanded food consumption (money value) by participants in Detroit (+34 percent) and rural Fayette County (+9 percent). In both areas, animal products, fruits and vegetables accounted for more than 80 percent of the increased consumption. Findings further indicated that a very high percentage of the Federal subsidy was used in creating a net expansion in the retail food market in Detroit and only slightly less--over 80 percent--in rural Fayette County. Companion nutritional studies conducted by the Consumer and Food Economics Research Division, ARS, found that the percentage of participating households with diets meeting allowances of eight nutrients recommended by the National Research Council increased from 29 to 48 percent in Detroit, and 26 to 39 percent in rural Fayette County after the Program was initiated.

Findings further indicated that while the Food Stamp Program met basic objectives in both areas, it appears to be most effective in metropolitan areas where needy families do not have access to home produced or gift foods, and draws participation primarily from the lowest-income and larger family groups.

Retabulations of household food consumption survey data to show effects of termination of commodity distribution upon needy families constitute an important segment of this year's work.

2. Surveys of Retail Food Store Sales. Retail food store sales surveys were conducted in each of the eight original areas before and after initiation of the Food Stamp Program during 1961. Findings indicated an overall increase in food sales of about eight percent--with gains registered in all store size categories. In April 1962, after the Program had been in operation for about nine months, repeat surveys initiated in two areas indicated that gains in retail food sales have held at approximately the same level.

3. Direct Distribution. A study of distribution of federally donated foods within States to schools, institutions, and needy families has provided cost

and operational information to Federal, State and local program operators which has facilitated management decisions concerning distribution procedures. This work was conducted in response to requests from Federal and State program managers and House Sub-Committee on Governmental Efficiency. Findings indicated that a decentralized distribution operation with initial shipments to points close to final use or issue and handling by local agencies tends to involve considerably less cost than a centralized state-wide storage and distribution system. However, centralized distribution is required in other States with low population (participants) density, adverse climatic conditions, public interest in attaining distribution cost equalization among local agencies, inability or lack of interest by local agencies in undertaking food handling services.

4. Increasing Food Consumption of Low Income Families. Background information concerning numbers and categories of low-income families and alternative public programs for supplementing diets of needy families were assembled under a project for evaluating methods of increasing food consumption of low-income families. This compilation was of assistance in the planning and development of the pilot Food Stamp Program. The project was superceded by others more directly related to requested evaluations. Project was terminated in February 1961 without publication of findings.

B. Evaluation of School Lunch Programs

1. Plentiful Foods Information. A study was undertaken to determine the effectiveness of the Plentiful Foods Program in expanding commercial markets for plentiful foods through dissemination of marketing information to schools participating in the National School Lunch Program. A mail survey of 1,447 midwestern schools indicated that the Department's effort was achieving 95 percent coverage--and in two-thirds of these schools--represented the only information received on plentiful foods. Smaller schools, elementary schools, and those in low-income neighborhoods were found to be making most use of the information. A report has been published and project terminated.

2. Urban School Systems Without Feeding Services. During 1959-60, urban public school systems without noonday feeding services were contacted concerning their intentions to initiate such services. It was found that relatively few (124) systems in cities of 10,000 or more persons offered no food services. By 1963, one-half of these systems would be serving lunches in some schools. About one of five pupils enrolled will have lunchroom facilities available by 1963. Project was terminated in June 1961 after publication of results.

3. Market for Food in Schools. Mail questionnaires concerning school food services have been forwarded to a representative sample (5 percent) of about 5,000 public and 1,000 private elementary and secondary schools.

C. Evaluation of Special Milk Program

No work has been undertaken during the reporting period other than through the milk services phase of the market for food in schools project listed above.

PUBLICATIONS REPORTING RESULTS OF USDA AND COOPERATIVE RESEARCH

Evaluation of Food Stamp and Direct Distribution Programs

- Reese, Robert B., and Adelson, Sadye F., June 1962. Food Consumption and Dietary Levels Under the Pilot Food Stamp Program. (AER-9).
- Reese, Robert B., August 8, 1962. The Research Evaluation of the Pilot Food Stamp Program -- at the National Food Distribution Programs Conference, Washington, D. C.
- DePass, Rudolph E., April 1962. Food Stamp Plan Changes Dairy Consumption. Dairy Situation.
- Reese, Robert B., October 1961. Utilization of Agricultural Resources Through Public Food Distribution Programs. The Marketing and Transportation Situation. Reprinted as (ERS-48).
- Frye, Robert E., April 1962. Effect of the Pilot Food Stamp Program on Retail Food Store Sales. (AER-8).
- Food Distribution Division, April 1962. The Food Stamp Program--An Initial Evaluation of the Pilot Projects. (AMS-472).
- Frye, Robert E., and Smith, Hugh M., May 1962. Retail Sales in Food Stamp Stores. Agricultural Marketing.

Evaluation of School Lunch Programs

- Anderson, Kenneth E., and Reese, Robert B., September 1962. Plentiful Foods Used in Schools. Agricultural Marketing.
- Anderson, Kenneth E., April 1961. Urban School Systems Without Lunch Service as a Potential Market for Foods. (AMS-443).



## AREA 2

## MARKET POTENTIALS FOR NEW PRODUCTS AND USES

Problem. Increased emphasis should be placed on new products and new uses because of their importance in expanding markets and maintaining a high rate of economic growth. Agricultural producers and processors need to take maximum advantage of the opportunities offered with respect to additional outlets for surplus supplies, increased returns, lowered costs, and improved competitive positions relative to non-agricultural products. Continuing evaluations are needed of the commercial feasibility and market potentials of new or improved agricultural products, by-products, and products from new crops in food, feed, and industrial uses; of the economic feasibility of developing new uses and establishing new crops including appraisal of their impact on present markets; and of the economic and technical requirements of end-uses. Such evaluation will provide a sound economic base for decisions on commercial development as well as information to guide further utilization research by physical scientists.

## USDA PROGRAM

The Department has a continuing long-term program involving agricultural economists, economists and personnel with dual economic and technical training engaged in research to bridge the gap between laboratory developments and commercial adoption so as to assist producers to realize more rapidly and more fully benefits of lowered costs, increased returns, and expanded markets that new products and new uses can afford. Research is carried on in industrial and food uses at Washington, D. C. and five field offices--agricultural economists are located at each of the four regular Utilization Research and Development Divisions, New Orleans, Louisiana; Albany, California; Philadelphia, Pennsylvania; and Peoria, Illinois; and at the Hawaii Agricultural Experiment Station, Honolulu, Hawaii.

Research is conducted on dairy products, fibers, fruits and vegetables, grains and feeds, livestock products, poultry and eggs, oilseeds, new crops, and on impacts of technological innovations. Research on Kona coffee and Hawaiian fruits and vegetables is conducted cooperatively with the Hawaii Agricultural Experiment Station. Research on maple products is carried out cooperatively with the Pennsylvania Agricultural Experiment Station. The Louisiana State Agricultural Experiment Station is participating in research on a new sweetpotato product.

The Federal scientific effort devoted to research in this area totals about 24.7 man-years including 4.7 equivalent man-years in contract research. Of this number about 12.7 represent food uses research and 12.0 industrial uses. Commodity wise, 1.7 man-years is currently devoted to dairy products; 1.7 to fibers; 3.5 to fruits and vegetables; 6.4 to grain and feeds; 0.5 to livestock products; 1.5 to poultry and eggs; 6.9 to other farm products (mainly oilseeds and new crops) and 2.5 to impact of technological innovations.

## RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

State Experiment Stations in 1961 reported 4.1 professional man-years divided among subheadings as follows: Dairy products 0.6; Livestock and Livestock Products 0.4; Poultry and Eggs 2.0; and Other 1.1. Indiana, Michigan, and Pennsylvania are engaged in the analysis and handling of milk and milk products, developing greater efficiency in the processing and distribution of dairy products to meet new and present needs, and thereby increase consumption. Texas is studying the marketing and utilization practices and problems of the Texas wool and mohair industry to bring about greater efficiency in handling, and to develop new and improved uses of these products. New York (Cornell) is engaged in developing new products and uses from eggs and fowl in an attempt to expand markets for these products.

Limited resources as phases of broader projects are being devoted to work on fruits and vegetables, grains and feeds, and the impact of technological innovations in the area of market potentials for new products and new uses.

Industry and other organizations including food manufacturers, industrial firms, producer associations and State agencies also conduct or sponsor important research on new products and new uses. Most food manufacturers regard market potentials research as a necessary adjunct to their research and development programs for new food products. The expenditure for this type of research, however, is small compared to total new product research and development. The Department has provided leadership in many areas of product and process development. Because of this, duplication of effort is rare and the market potential research on new products developed by the Department is used widely by various food manufacturers to provide a basis for commercial testing and for decision-making regarding commercial production.

Among those industrial firms which process and market agricultural products most key firms have or retain competent research and development organizations. However, many end-use manufacturers are not concerned with the source of raw material, and therefore, agricultural products receive only such attention as is required to make a decision among the raw materials available. Results of these market research efforts mostly are kept confidential. Orientation of industry research emphasizes proprietary products and factors of market use, while the Department's research is devoted exclusively to the possibilities of expanding agriculture's share of industrial markets and the means by which agricultural materials may improve their competitive position. Much of the basic information necessary for market potential evaluation by private manufacturing firms such as market area penetration analyses stems from published research data of the Department or other government agencies.

Several producer associations sponsor research on development of new food products and contribute to the early stages of commercial trial and evaluation of these products. Notable in this area are the Florida Citrus Commission, the American Dairy Association, and the Kansas Wheat Commission. Some of this program is in cooperation with the Department.

Various States engage in market research for new industrial uses for agricultural products. For example, Nebraska has a long-range program of research and development, estimated at \$300,000 per year, with about one-tenth devoted to market research and development. Others, such as Oklahoma, Missouri, North Dakota, and Kansas, have commissions or groups assigned to similar efforts.

Although precise information is not available it is estimated that food manufacturers devote about 100 professional man-years to this type of research; industrial firms 75 man-years; producer associations 5 man-years; and State agencies 15 man-years.

## REPORT OF PROGRESS FOR USDA AND COOPERATIVE RESEARCH

### A. Dairy Products

1. Market Potentials for Low-fat (two percent) Milk. Changes in consumers' purchasing and consumption habits combined with competition from other products were significant factors behind a 10 percent drop in the per capita consumption of fluid milk and cream between 1950-60. In an attempt to increase fluid milk consumption the industry has begun marketing a low fat milk. This product, commonly referred to as "2 percent milk," contains approximately 2 percent butterfat with or without additional non-fat solids and/or vitamins

All segments of the dairy industry as well as the Federal Government, because of its dairy support program, have a vital interest in any product whose sale may increase the overall consumption of fluid milk. Therefore, this study is being made to determine the market potential for this low fat product, and measure on a continuing basis its sales impact on other fluid milk products in order to provide objective information heretofore not available to the various segments of the dairy industry on the effect of "2 percent milk" on total milk consumption.

Federal Milk Order Market Administrators have furnished information by mail concerning the availability of sales data, product composition, brand names and initial date of sale of low-fat (2 percent milk) in their areas. Analysis of the data shows the product is currently sold in 71 of the 81 order markets. This material is being used for the preliminary selection of cities in which surveys of consumers and fluid milk processors will be conducted. Beginning in July 1962, market administrators will report sales data for the "2 percent" product as a separate item on their monthly product reports.

### B. Fibers

#### Wool

1. Economic Effects of Foreign Material in Wool on Present and Potential Markets. Foreign materials in wool limit potential applications of wool. For example, jute fibers from bags can show up as defects in finished goods. Competition from clean, contaminant-free synthetic fibers in apparel fabrics makes the need for elimination of foreign materials from wools particularly acute. Under a cooperative agreement with WU-ARS, and a private firm, research has been conducted to evaluate the economic capabilities of a redesigned shipping container for grease wools in reducing or eliminating jute fiber contamination in wool. Observations of the results of test bag wools through processing into finished wool cloth have been made and identification of foreign materials appearing in test bag lots versus control lots is being made.

2. Market Potentials for Interfacial Polymerized Wool (Wurlan) in Textiles. The Department's Wool and Mohair Laboratory has patented and developed the interfacial polymerization, "Wurlanizing," treatment for wool. This treatment prevents felting shrinkage of wool fabric. Wool fabric processed in this way is home



launderable. Apparel manufacturers and retailers have indicated a very strong interest in merchandising home launderable wool products. Market research is being conducted to ascertain the possibilities of expanding wool consumption in those apparel lines where the feature of home launderability is likely to be beneficial. Information on the importance of home luanderable wool apparel presently is being sought from garment manufacturers and retailers. This process for treating wool fabric is being adopted by several wool fabric mills and should enable wool to compete more effectively with other fibers.

### Cotton

3. Market Potentials for Cotton Fibers and Fabrics in Cotton-reinforced Plastic Laminates. Research, nearing completion, has been carried out to evaluate possibilities for cotton to obtain a larger share of the growing plastic laminates market. This study indicated that there are three basically different laminate markets which will use varying volumes of cotton in the future. The first, high pressure plastic laminates, is now consuming 58,000 bales of cotton per year but prospects are good only for market maintenance through increased product improvement. The second, low pressure or reinforced plastics, now uses and will continue to use only small volumes of cotton in a rapidly expanding market. The third, flexible laminates are a small but growing use of cotton reinforced fabric. Further developmental research can help expand this growing market for cotton.

### C. Fruits and Vegetables

1. Market Potentials for Superconcentrated Apple Juice. Relative to other major fruits the processing market for apples appears to be at less than its potential capacity. In cooperation with the Michigan State Apple Commission and EU, ARS, a market test was conducted on EU's 7-fold concentrated apple juice to ascertain the potential for this processed product. The results of the market test conducted in Fort Wayne, Indiana have been analyzed and a manuscript is in process of publication. The product shows excellent promise of commercial success. During the market test, it ranked in the top 10 percent of audited sales among 81 frozen, canned, and bottled juices in Fort Wayne supermarkets and far outsold existing single strength apple juices in the test market.

2. Commercial Possibilities of Dehydrofrozen Apple Slices in Institutional Markets. Data collected from product tests of dehydrofrozen apple slices, a new product of WU, ARS, where there is a 50 percent weight reduction by dehydration and then preserved by freezing, have been analyzed. A final report showing the results of this study is being cleared for publication.

The product appears to possess excellent commercial possibilities, particularly in large baking establishments where the considerable volume savings are more meaningful. At the time of the study's inception, there was only one commercial processor of dehydrofrozen apple slices. Today there are at least eight processors in production with others considering the possibility. In addition, several national and regional grocery chains are now using dehydrofrozen apple slices in their pie-baking operations.

3. Market Potentials for Processed Potatoes in Selected Outlets. Potato processing has increased greatly in recent years and is thought to be instrumental in halting the long-term downward trend in potato consumption. Work to determine the degree of market penetration of processed potato products and other economic considerations has been completed and the results have been published. Final analyses

of the retail sales of processed potatoes in Philadelphia, Milwaukee, New Orleans, and Oakland during 1960, and institutional use in Philadelphia show that considerable penetration has been made in both the institutional and household markets, and there appears to be no expectation that growth in these markets will slow down in the near future.

The results of additional research concerning the comparative cost of processed potatoes to consumers and other economic considerations show that, if a reasonable value were put on the homemaker's time, many processed potato products would have a lower cost than fresh or homemade. A taste panel also found that most brands of processed potato products were comparable in eating quality to fresh potatoes.

4. Market Potentials for Sweetpotato Flakes in Selected Markets. New products could assist in revitalizing the declining sweetpotato industry. Institutional market tests of instant sweetpotato flakes developed by SU, ARS, have been carried out in Cleveland, Ohio, and New Orleans, Louisiana.

The research results indicate a highly favorable reaction to instant sweetpotato flakes by the management, kitchen help, and customers of the restaurants and other types of institutional outlets. Evidence from this study indicate there is a potential market for sweetpotato flakes in restaurants. When offered in the menu, 20 to 25 percent of the customers ordered them, and customer acceptance was noticeably favorable.

It appears that the relatively widespread use of dehydrated white mashed potatoes in restaurants will help to facilitate the acceptance of sweetpotato flakes. Restaurant operators who were users of the dehydrated white mashed potatoes--about half of the sample restaurants-- were more apt to react favorably to the test product. Most institutional operators liked instant sweetpotatoes because they were easy to prepare, saved time and labor, added variety to menus and were nutritious.

#### D. Grains and Feeds

1. Market Potentials for Frozen Bakery Products. In recent years, retail prices of bakery products have risen more than those of other food products. The use of freezing may provide a means for reducing bread marketing costs. As a first step in appraising the feasibility of adoption of this change in distribution methods, a survey of some 500 bakers has been carried out to collect detailed information on bakery operations and the probable role of freezing. Data from this study will show how freezing is currently being used by bakers, trends in its uses and applications, and the effect that freezing of baking goods has had on operating costs. Work is now under way to analyze the data collected and to prepare a publication of findings for widespread use in decisions on the further role of freezing in bakery products production and distribution.

2. Market Potentials for Bulgur (Redi-wheat). A market test of canned cooked wheat (Redi-wheat) developed by WU, ARS, was conducted in cooperation with the Kansas Wheat Commission and WU in Wichita, Kansas. The data collected have been analyzed and a final report has been prepared.

During the market test, Redi-wheat outsold 57 established foods which might be used in similar ways. Six months later sales had leveled off not achieving as high a level as hoped for, but outselling six out of ten of the 57 similar products. Redi-wheat is now being distributed commercially in the Kansas, Colorado, and Missouri area. Efforts are continuing by the Kansas Wheat Commission to

encourage large national food distributors in adding Redi-wheat to their line of products and it is understood that this step is being seriously considered by a major food organization.

3. Rice Distribution Patterns in Domestic and Territorial Markets. In a continuing effort to improve distribution efficiency based on more complete knowledge of markets, work has been initiated to develop fundamental information on the present characteristics of the domestic rice market for direct food use by determining (1) present rice distribution practices, including type of rice, kind of buyer, and package information; and (2) domestic rice distribution patterns, including the location and size of markets, variations between markets, and factors associated with distribution patterns. Data on the distribution of rice will be collected through the cooperation of rice millers as well as re-packagers. The data collected from the industry will be on a nationwide and territorial basis for the crop years 1960-61 and 1961-62. All firms engaged in rice distribution (about 80 in number) will be contacted to furnish these data.

4. Market Potentials for Materials of Agricultural Origin in Adhesives. Research is nearing completion to appraise the technological and economic factors affecting use of adhesives, to relate these to present and potential markets for agricultural materials in adhesives manufacture, and to provide guides for further research based on more precise knowledge of end-use requirements. Adhesives have high value per unit and agricultural raw materials for adhesives from such sources as corn, wheat, soybeans, animal byproducts, and fats and oils need to keep pace with expanded use of synthetics in adhesives.

Three classes of agricultural materials are important in adhesive uses; starches and dextrose, vegetable proteins, animal proteins and bone glues have a 38.4 percent by weight and 17.4 percent by dollar value share of the \$450 million adhesive market. This share is expected to decline in the future, unless new and improved adhesive performance is achieved for them. Several areas for research and development to assist in market improvement were obtained from the study.

5. Effects of Use of Urea in Mixed Feeds on Market Potentials for Oilseed Meals. Use of urea as a protein source has caused concern over its impact on oilseed meal markets. Projections through 1964 show increasing use of urea in ruminant feeds. Urea use will expand from an estimated 80,000 tons in 1959 to 125,000 tons in 1964.

Nutritional research continues on the use of urea in supplements. In this work more urea is used in relation to natural protein ingredients than is now practiced. Research projects using urea-molasses or urea-alcohol and forages to replace oilseed meals also have been continued. However, urea is not expected to replace a substantial portion of oilseed meal use in ruminant feeds over the next few years, as use will be equivalent to about 10 percent of oilseed meal in 1964.

6. Market Potentials for Cereal Grain Starch Products in New Industrial Uses. Expansion of industrial uses for cereal grains, in large surplus, is essentially a problem of finding new uses or expanding existing uses for starch or for products in which starch or a starch derivative is a major component. Economic research is needed to identify new market possibilities and to evaluate technoeconomic factors affecting potential new uses for starch. As a first step in meeting these needs a contract study has been initiated to carry out a patent search and a bibliography review of starch research for the period January 1,



1951 to June 30, 1962. The contractor will also make a critical evaluation of marketing ideas and products exposed in the literature and arising elsewhere for guides to new industrial use development for cereal grains.

Research will be directed to the most promising new uses suggested through this comprehensive review to evaluate potentials and to otherwise explore, from an economic viewpoint, possibilities for expanding use through new applications.

#### E. Livestock Products

Market Potentials for Hides and Skins. Hides and leathers have been experiencing increased competition in the leather consuming industries. Synthetics have been substituted in a number of uses and a new threat exists in the shoe market in the form of a leather-like synthetic being tested by a chemical firm. Analyses are being made of information obtained from suppliers and manufacturers to determine potentials for retaining leather markets through improved physical characteristics and qualities to meet market needs. In addition plans are being developed to appraise alternative markets to leather for raw materials from hides and skins, primarily collagen or gelatin.

#### F. Poultry and Eggs

Market Potentials for Improved Egg Products in Remanufacturing Uses. Most of the work on this study to determine the market expansion possibilities for egg products of improved quality in remanufacturing uses has been completed. The data collected have been analyzed and the manuscript of the report of the findings is being prepared. Based on the findings from this study it would appear that the use of dried egg products and egg containing prepared dry mixes will increase substantially in the years immediately ahead. Increases in the use of dried eggs will be largely at the expense of frozen eggs. The convenience aspect of dried eggs and pre-mixes appeals strongly to industrial users. Resistance to the use of dried eggs and pre-mixes is fast disappearing, and apparently, is no longer a strong deterrent to expanded utilization, with the possible exception of the small retail baker.

#### G. Other Farm Products

##### Oilseeds

1. Market Potentials for Modified Edible Fats and Oils. Although little change has occurred in the per capita consumption of fats and oils in the U.S. during the past decade, major shifts have occurred both among food fat products groups and within groups, as well as important shifts in fats and oils used in end products. These trends have been accelerated by changes in food technology, consumer tastes and regulatory requirements which have led to demands for new and improved fats and oil products for the older markets, as well as intensification of the search for new markets. Utilization research development of new and improved fat and oil products with special properties making them suitable for use in confections, bakery products, food and container coatings, edible lubricants, emulsifiers, coating oils and fats, and other special uses offer an opportunity for opening up entirely new markets for edible fats and oils. A variety of modified fats including a cocoa butter-like fat, dibasic-acid containing fats, and edible polymers and polyester-type derivatives of cottonseed oil are now and will be available to food processors for specialized end uses.



Research has been initiated under contract to appraise the market potentials for edible modified fat products of agricultural origin; to evaluate the competitive situation in relation to price and properties among various modified fats now available and between products of non-agricultural origin in food and container coatings, waxes, and polishes; and to determine the need for improved specialized fat and oil products which would serve as guides for future research and development.

2. Market Potentials for Fats in Feeds. Research on potentials for fats in feeds has been completed. Within the span of a few years feed use has developed into the largest single new market for fats and oils. It is predicted that this market will continue to grow in the next 10 years. Increasing numbers of feed manufacturers are adding fats to feeds and feed ingredients. As manufacturers gain experience in adding fats they are using fats in a wider range of products as well as increasing the level of fat added. An important factor in expanded production and increased efficiency in poultry has been the use of high energy rations using added fats in feeds. These and the many other advantages of adding fats to feeds has enabled this to develop into a major market outlet that has stabilized tallow and grease prices, particularly important in view of the displacement on other markets such as soap by synthetic materials. A wide range in kind and grade of fats and oils materials were found to be used with good results. Supply availability most frequently determines kind and grade of fat used.

3. Market Potentials for Fats and Oils and Fatty Acids in Selected Industrial Use Markets. Technological developments have enabled non-agricultural raw materials to displace agricultural fats and oils and their fatty acid derivatives in some traditional market outlets, and have reduced their use per unit in other applications. New fats and oils products have been developed, and research is under way to determine their potential for improving the competitive position of agricultural fats and oils. Research is also being conducted to determine requirements for a number of end uses as guides for further physical research to development of properties that will permit fats and oils and their derivatives to meet competition from synthetic materials. Fieldwork was completed during the year. The contractor has prepared drafts of reports in each of six market areas.

Users of fats and oils surveyed often cited pricing and quality of these materials to be paramount problems. Fluctuation of commodity prices discourages long-term investments in plants and processes to utilize these materials, and the inability to make long-term contracts to supply users of derived materials from these fats and oils puts a strong damper on private research toward new product and process developments.

On quality, the inability to obtain stocks of material on a standardized quality basis at all times in the open market, and variations in quality of material with a single description and price created problems for firms seeking or using these materials.

4. Market Potentials of Unextracted Soybean Meal in Poultry Feeds. Research has been directed at some of the economic questions relative to whole soybean meal. Findings based on a study of the Arkansas poultry area indicate unextracted soybean meal would offer an alternate outlet for soybeans and at the same time afford feed manufacturers and livestock feeders who mix their own feeds an opportunity to have larger amounts of fat in their feeds, without

requirement of special fat handling equipment. Inedible tallow and grease are the primary fats being added to formula feeds. The price spread between tallow and grease and soybean oil has been narrowing in recent years, making the processing of cooked, unextracted soybean meal more attractive. In some areas of the United States, production of soybeans and consumption of soybean meal are high, but processing facilities are not locally available. Soybeans are shipped out of these areas and meal is shipped back in. Lowered freight costs on this feed ingredient would amount to a substantial saving. For these reasons cooked, unextracted soybeans may find its most attractive economic position in areas away from the main soybean production and processing areas.

5. Market Potentials for Fats and Oils in Plasticizers. A special tabulation of fat-derived materials used in plasticizers in 1958 and 1959 was made by the U.S. Tariff Commission to meet industry requests for current data. Consumption of fats and oils in 1959 was about the same as the 72 million pounds reported previously as used in 1957, but total plasticizer use increased from 442 to 524 million pounds. However, new and improved plasticizers from fats and oils increased in use with the increase in total use of plasticizers. The information was reported in the Fats and Oils Situation, November 1960, and reprinted as the Supplement to AMS-382, "The Market Potential for Fats and Oils in Plasticizers."

#### H. Other

1. Market Potentials for Products from New Crops for Industrial, Feed, Food, or Pharmaceutical Uses. As part of the Department's new crop research program, market potential evaluations for new crop materials for industrial, feed, food, or pharmaceutical uses are carried out to provide an economic basis for the selection of crops with the greatest potential for further development and field testing.

As a result of findings revealed by this research, commercial firms have become better acquainted with the potential new crops and the future possibilities for processing and marketing them. Particular interest has been shown toward Vernonia anthelmintica, a new oilseed crop that yields epoxy-type oil for plasticizers and other uses. The Department has been urged to seek early commercial development of this new oilseed crop.

2. Market Potentials for Water Soluble Gums and Mucilage other than Starch. Water-soluble gums and mucilages (other than starch) can be supplied from cereal grains or from new crops. These materials could compete with or replace imported materials. There is a need for and research has been initiated to determine the modifications needed in gums from domestic sources to promote their commercial use in a wide variety of products. Gums are used in adhesives, cosmetics, emulsions, gelatins, bakery and beverage products, pharmaceuticals, textiles, paper, oil-well drilling fluids, detergents, photographic specialties, coatings, and soil conditioners.

3. Market Analyses of Maple Sirup and Other Maple Products. A cooperative agreement has just been entered into with the Pennsylvania State Agricultural Experiment Station to study some of the problems involved in reducing maple processing costs and expanding markets.

Work was initiated to identify the present and potential market for maple sirup and other maple products; to develop alternative marketing procedures adapted to a central evaporator plant; and to study the economics of supplying a central evaporator system with sap.

4. Market Potentials for Hawaii Farm Products. Research in cooperation with the Hawaii Agricultural Experiment Station has been initiated to determine the economic feasibility of broadening the base of Hawaiian agriculture by developing new markets for diversified Hawaii products such as Kona coffee, macadamia nuts, and fruits and juices. Market tests will be conducted to introduce Hawaiian products in new markets to ascertain their acceptability and salability and to provide estimates of potential demand to guide market development efforts. Marketing and merchandising practices will be evaluated to determine improvements required for full exploitation of market expansion possibilities.

In addition, research was conducted involving the economics of the Hawaiian beef industry in 1962. Preliminary results of this research show that Hawaii's beef industry is confronted with revolutionary developments, which have brought it face to face with a difficult financial situation. These developments are greatly increased imports of both high and low quality beef, the latter originating in foreign production areas having low costs; changes in the demand structure for beef; changes in the type of Hawaiian retailers and in their business practices; need to change to higher quality-higher cost beef; and higher costs of labor, land, materials, equipment, taxes, and transportation.

#### I. Technological Innovations

1. Relative Costs of Convenience Foods. This research was designed to determine whether the ever increasing number of convenience foods increase retail food prices. Comparisons were made of prices paid by consumers for convenience type foods and the same foods in fresh or less highly processed forms. A preliminary report of the findings was published. These analyses revealed that of the 158 convenience type foods in the study only 42 were less expensive than their home-prepared counterparts. The remaining 116 were more expensive. Yet, in the quantities purchased by this country's discriminating housewives the effect of the less expensive convenience foods outweighed the effect of the more expensive convenience foods by \$1.07 per \$100 spent in grocery stores for food. That is, the cost of purchasing the \$14.03 worth of convenience foods in fresh or homemade form would have been \$15.10 -- or \$1.07 more than purchasing them in their convenience form.

2. Economic Impact of Freeze-Drying. New technology can have tremendous consequences and their impacts need to be evaluated with special reference to costs, market structure, labor demand and utilization, capital needs, and market demand. Freeze-drying is an emerging technology of possible major import which requires study to ascertain its place and impact in the marketing system. Since initiation of this newly formed industry a test panel for existing commercial products was established with the cooperation of ARS at Beltsville. Also, with the cooperation of plants either commercially processing or experimenting with commercial pilot operations, and from representatives of equipment companies, data has been gathered which will form a basis for a synthetic projection of what costs may be anticipated with model plants constructed in the following sizes: 4 tons, 8 tons, 16 tons,



and 32 tons of water removable ability for a 24-hour period. Work has been initiated to use such engineering synthetic cost data to estimate the impact of freeze-drying upon food processing industries and in the process to estimate the long-run potential of the freeze-dry industry.

The taste panel work covered approximately 30 freeze-dry products now on the market. Comparisons of current frozen and canned products of standard quality were used as a frame of reference for the testing of the prepared freeze-dried foods. Preliminary results suggest many of the products are satisfactory from a taste standpoint. However, a few appear to be unsatisfactory.

Preliminary estimates imply that the cost per pound of water removed will approximate 7 cents for a low volume capacity operated plant, and about  $3\frac{1}{2}$  cents for a large capacity operated plant. A full report of the engineering synthetic costs should be ready for publication during the fiscal year.

#### J. Liaison Between ERS and Utilization Research, ARS

An agricultural economist is stationed at each regional Utilization Research and Development Division to provide liaison between the regional laboratories, ARS, and the Economic Research Service in order that economic research may be teamed with physical science research in approaching problems relating to new products and new uses. Phases of work are as follows: (1) To delineate the economic problems involved in developing markets for new and extended uses of commodities on which the laboratories are working; (2) to develop and assist in carrying out research studies for providing information that would aid the laboratories in deciding what particular products or processes would be most likely to be economically feasible; and (3) to develop and assist in carrying out research studies for appraising new products and processes developed by the laboratories, including studies of market potentials, comparative costs, and studies of the probable impact of new developments on sales and farm income.

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### AREA 3 MERCHANDISING AND PROMOTION

Problem: Merchandising, promotion, product distribution and movement, and management of marketing firms play a vital and important role in the selling of farm products. Through increased efficiency of these functions of distribution, returns to producers can be strengthened and savings in the form of lower food costs passed on to consumers. Substantial resources are invested annually by farm groups and processors of agricultural products in advertising and promotion. Research is needed and being sought by these groups to measure the sales response of different commodities to various promotional techniques and themes in relation to investments in sales promotion. Also, the need for information on the availability of extent of distribution and the flow of products into consumption is widely recognized by producer and trade groups. Merchandising research is needed in evaluating and testing the best ways of maximizing sales at the retail level and increasing the selling efficiency of the firm. There is also a critical need for information that will lead to improvement in management efficiency of firms distributing farm products at different stages in the marketing channel. Evidence of this need is illustrated by the independent retail food outlets, affiliated and nonaffiliated, which account for approximately 60 percent of retail food sales and have neither the resources nor experience to perform needed research to improve their efficiency. Similarly, there are other small firms operating at various stages of the marketing system for farm products that need assistance in such problems as inventory control, functional coordination, accounting and cost controls.

#### USDA PROGRAM

The Department has a continuing long-term program of research involving both basic studies and the application of known principles to merchandising and promotional problems of growers and the distribution trade in expanding the domestic demand for agricultural products. Research evaluating promotional programs of agriculturally-oriented groups is conducted to determine: (1) Responsiveness of specific commodities to advertising and promotional activities, and identify characteristics of products that are responsive saleswise to promotion; (2) relative effectiveness of different promotional techniques or approaches when employed alone or in combination; (3) sales response-promotional investment relationship for selected products; and (4) organizational structure and procedures of commodity groups for optimum control, coordination and effective conduct of program. Another phase of the research program involves analysis of movement and availability data at retail and wholesale levels, and consumer purchase data by family characteristics including, regions, rural and urban areas. This research delineates markets, and provides producer groups information on movement and market profiles for specific products in planning and executing marketing programs.

Research is conducted to determine the influence on sales and consumer demand of merchandising practices and pricing policies characterising the marketing of specific commodities at the retail and wholesale levels of distribution. Evaluations are planned so that findings contribute to general principles and standards of performance relating to such factors as methods, type, location and size of displays; type, kind, color and size of package; variety and quality of products; and pricing techniques.

Another basic area of research is designed to increase the efficiency of management through improvements in accounting procedures, inventory control, ordering, space allocation, and functional coordination between wholesalers and retailers, and thereby reduce costs associated with these items in the distribution of farm commodities.

The Federal scientific effort devoted to research in this area totals 18.0 professional man-years annually. Of this number 1.0 is devoted to dairy products, 5.8 to fruits and vegetables, 1.0 to livestock products, .5 to grain and feed, 1.2 to poultry and eggs, 5.1 to studies covering several commodities which cannot be allocated meaningfully to specific products, 3.1 to contracts (dairy .3, and multiple products 2.8) and .3 to program leadership.

The major portion of the research work is located in Washington, D. C. Some studies are being conducted in cooperation with the State Experiment Station of Arizona, Indiana, Massachusetts, and Washington. Also a number of studies are conducted cooperatively with commodity marketing and promotional groups who contribute financially to the research effort. Included in these groups are: The National Broiler Council, American Dairy Association, The Oregon-Washington-California Pear Bureau, The National Apple Institute and The Florida Citrus Commission.

#### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

A 1961 study of State experiment stations showed a total of 26.0 professional man-years divided among subheadings as follows: Dairy products 3.7, fruits and vegetables 1.7, livestock and livestock products 4.6, poultry and eggs 4.3, and multiple products and other farm products, (including forest products and horticultural specialties) 11.7. Research on merchandising and promotion of dairy products, and poultry and eggs is in progress in most areas of the Nation; fruit and vegetables by Cornell, Southern region, Puerto Rico and Hawaii; livestock and livestock products Michigan, Missouri, Kentucky and West Virginia; horticultural specialties by the Northeast and Southern regions.

Industry and other organizations including voluntary producer-promotion groups; commissions, councils, boards, etc., established under enabling legislation; wholesalers and retailers; processors and distributors; State Departments of Agriculture, and individual proprietors, also conduct some research on merchandising and promotion. Private or corporately owned firms of this group carrying out independent research, with few exceptions, keep the results confidential. The exception to privacy is where research findings become part of daily operating practice and are open to public inspection. Merchandising and promotion research conducted independently by voluntary groups, commissions, councils etc., with few exceptions is limited in scope, and most often directed toward answering specific questions connected directly with their programs. However, both private firms and agricultural promotion groups do contribute to public research in this area by cooperating with the Department. They provide facilities (which are essentially laboratories), personnel, office space and economic data to the USDA program. The agricultural promotion groups cooperating with the Department finance all merchandising and promotional cost involved in cooperative research studies and frequently contribute financially to the research by defraying part of the cost of collecting data.



## REPORT OF PROGRESS FOR USDA AND COOPERATIVE PROGRAMS

Dairy Products. It is estimated that restaurants and other public eating places account for 20 to 25 percent of total food expenditures. A survey of merchandising and promotional practices employed by these establishments for milk and other products was conducted under contract to provide dairy, other agricultural groups and restaurant operators with pertinent information on current practices employed by these firms as related to sales volume and net returns.

The results showed that milk was carried by the majority of establishments only as a service to customers. Milk was not considered to be a source of income, however, management consistently underestimated the gross margins earned per serving. Milk was offered on menus most often as a separate item, and very rarely as a choice of beverages with a meal at no extra charge. Approximately one-fourth of those interviewed in Hartford indicated that they participated in special promotional programs (such as June Dairy Month) for dairy products. However, only 3 percent of those interviewed in Indianapolis reported participating. The reason most frequently given for not participating was that they did not know about the program, or were not asked to participate. Point-of-purchase materials for dairy products were observed in about 20 percent of the establishments. The materials most frequently used were window signs and decals encouraging the purchase of ice cream.

Butter was used as a spread by 90 percent of the firms in Hartford, but by only 40 percent in Indianapolis. The average quantity used per week for table use was 13 pounds in Hartford and 14 pounds in Indianapolis. The average quantity used per establishment relative to other spreads in both cities increased with the annual sales volume.

About one-half of the respondents interviewed indicated a desire for menu suggestions.

Fruits and Vegetables. Research is being conducted to evaluate merchandising and promotional practices characterizing the marketing of fruits and vegetables. Evaluation of advertising and merchandising activities by commodity groups is conducted to measure the effectiveness of these activities and to determine promotional alternatives that will maximize returns from promotional investments. Also work is under way to evaluate the effect of specific merchandising techniques on sales of selected fresh fruits in relation to associated cost. This work is conducted at the request and with close cooperation and assistance (often financial) of industry groups. Included in this work are studies to:

### Citrus

(1) Determine the long-term effect of advertising and promotion for Florida oranges and grapefruit. The analysis covers the period 1921-22 to 1960-61, excluding the World War II period 1942-1946. The findings indicate a succession of positive shifts of the sales-price relationship for oranges during the period analyzed. For grapefruit positive shifts of the sales-price relationship were observed prior to World War II, but a negative shift after the war. The shift of the sales-price relationship for oranges appears to be associated with advertising and promotion efforts, and special demand



creating conditions, such as, introduction of new products and changes in distribution which were supported by relatively intense promotional activity. Shifts observed for grapefruit were also associated with these factors prior to the war. The negative shift after the war appears to be the result of competition from frozen orange concentrate. The market position of grapefruit vis-a-vis oranges appears disadvantageous because of the relative consumer acceptance of concentrated juices.

(2) Evaluate the effect of the special promotional campaign for frozen orange concentrate conducted during the fall of 1959 on retail sales of frozen orange concentrate and the on tree prices received by growers for oranges. In the analysis sales increases and estimated increases in revenue were related to the investment connected with the special campaign. The findings of this study shows that average monthly sales were about 13 percent higher than could have been expected at prevailing prices without the promotional effort. The gross revenue from sales of frozen orange concentrate at the retail level from September 1959 through March 1960 was estimated to be about \$18 million greater than it would have been if prices had been reduced sufficiently to sell the same volume of juice. The findings also indicated that on tree prices received by growers during the 1959-60 marketing season were from 30 to 50 cents per box higher than would have been received if the price of frozen orange concentrate had been reduced to move the same quantity of juice.

(3) Ascertain consumer acceptance of fresh Florida oranges relative to the presence or absence of a color additive was determined. This study involved controlled experiments in selected retail food supermarkets located in Cleveland, Ohio (representing markets in which consumers were generally acquainted with color-added but not natural color Florida oranges), and in Philadelphia, Pennsylvania (representing markets in which consumers were acquainted with natural color Florida oranges). Sales of Florida oranges decreased significantly, 20 percent, in Cleveland when only natural color oranges were offered. In Philadelphia, no difference was found in sales of Florida oranges when natural or color-added fruit was offered alone. In both cities, sales of Florida oranges increased significantly, 36 percent in Cleveland and 20 percent in Philadelphia, when combination displays of color-added and natural color oranges were offered. These results indicated that a significant number of consumers do not purchase fruit of poor appearance with respect to color, while others do not tolerate additives to improve the color.

(4) Analyze trends and shifts in availability and consumer purchases of citrus and competing products. Data with brief analysis, are compiled and published in periodic reports. Monthly reports include: Volume of purchases, proportion of families buying, average size and frequency of purchase, and average retail price. Annual reports give information by region, size of community, and family characteristic, such as income, presence and age of children, occupation and education of family head, and by age and employment status of housewife. These data are obtained from a private research organization under contract with the Florida Citrus Commission, which, with some help from the California Prune Advisory Board, pays the entire contract cost. The Department analyzes the data, prepares, and distributes the reports. Among the findings are indications of losses of market among young and middle age families that offset gains among older families; declines in consumption rates among heavy buyers that offset gains among light buyers; shifts in use to new products and flavors; and

failure of use of frozen orange concentrate to keep pace with the growth of population.

### Decidious Fruits

(1) Evaluate the effects of apple promotion, in which two different general themes were used, on sales of apples and competing fruits. The findings of this research revealed that the promotional theme emphasizing the various uses of apples was more effective than the one emphasizing health and nutrition when employed independently. Sales increase over comparable periods of no promotion were 20 and 9 percent respectively for the "apple use" and "general health" themes. The effect of the apple promotion on sales of other fruit was not found to be statistically significant. However, the relationship's that were found corresponded to findings of previous research; namely, that practices which increase apple sales also benefit sale of oranges, and that apples and bananas are competitive saleswise. The retail merchandising practices employed with each of the fruits that could be measured in quantitative terms were also analyzed. Of these practices, price and the amount of display space devoted to each fruit exerted the most influence on sales. Sales varied directly with changes in display space and inversely with changes in price.

(2) Determine consumer acceptance of apples as related to percent of good red color. The results of this study showed retail sales of highly colored apples (75 to 100 percent good red color) were significantly greater than partial red apples (50 to 75 percent good red color), or apples ranging from 50 to 100 percent good red color. Sales of the combination of highly colored and partial color (50 to 100 percent color range) were significantly greater than sale of partial colored apples (50 to 75 percent color range). Losses from spoilage and excess handling were less from apples sorted in the narrower color ranges, 50 to 75 and 75 to 100 percent good red color.

(3) Evaluation of the sales effect of various promotional techniques for winter pears revealed that store demonstrations and dealer contests were equally effective as sales stimulants for winter pears as compared to no promotion. Sales increase of 24 and 22 percent respectively were recorded for the two techniques. Media advertising at a relatively low level of intensity, and special point-of-purchase displays were not found to be effective for expanding sales. The success or failure of these techniques to increase sales was directly related to the retailer support given them in terms of prices, display space, and newspaper advertisement space for winter pears. Retailers devoted greater display area and newspaper advertisement space to winter pears, and featured them at a lower price during periods when store demonstrations and dealer contests were conducted than during periods of no promotion. In contrast, retailers actually devoted less display space and newspaper advertisement space during the media advertising and special display techniques than they did during comparable periods of no promotion. There was only a small difference in retail price between each of these techniques and no promotion.

(4) In addition to the above research dealing with specific problems, a summary of published merchandising and promotion research conducted during the last 15 years on fresh apples is being prepared. This summary and similar summaries of research pertaining to other phases of apple marketing will be combined and released in one publication.



Livestock and Livestock Products. The American Sheep Producers Council has encountered difficulties in coordinating its promotional activities with those of various segments of the distributive trade. In addition the availability of lamb to consumers at retail has been limited in certain areas. Research appraising the relative effectiveness of two promotional techniques, or approaches, in generating sales and trade support was conducted in areas of relatively high and low lamb consumption. The two approaches evaluated were: (1) The councils regular program which is designed to create consumer awareness of lamb through media advertising and publicity emphasizing the various uses and nutritive value of lamb, and obtain trade cooperation through a field service force working with packers, wholesalers and retailer; and (2) a cooperative advertising arrangement with retailers in lieu of the media advertising normally conducted by the Council. The Council shared the cost of the portion of the retailers regular food advertisement devoted to lamb. The two approaches were the same in all other respects.

The combined lamb sales for northeastern and midwestern cities were 26 percent greater for cooperative advertising and 10 percent greater for the regular promotion program than for comparable periods of no promotional activity by the ASPC. The difference in sales effectiveness for the two approaches was consistent in both areas, and reflected the amount of trade support the two approaches generated. The cooperative advertising was about six times as effective as the regular promotion when measured in terms of the average increase obtained for a dollar's worth of promotion. The percentage increases in sales over no promotion for both approaches was greater in the Midwest, an area of low consumption. But the actual tonnage increases for each of the approaches over no promotion was much greater in the Northeast.

Poultry and Eggs. Research evaluating merchandising and promotional programs for broilers has resulted in the identification of some of the major determinants influencing the price received by growers. Included among these price determinants are chick placements, per capita income, season of year, volume of broilers in storage (frozen) and the previous months farm price. Quantitative estimates of the effect of these determinants show that chick placements, previous months price and cold storage holdings exert the greatest influence on current prices received by producers. Refinements are being made in the quantitative estimates of these variables pursuant to employing them in analyses relating shifts in the demand for broilers to promotional activities of the broiler council.

#### Multiple Product Research

(1) During June 1961 an average of 127 pieces of point-of-purchase material were being used for in-store promotional purposes by food supermarkets having sales of \$300,000 or more annually. The volume and nature of point-of-material used by food retailers was determined through observations conducted in more than 1,800 U. S. supermarkets. About 75 percent of the material found in the food stores promoted specific food products; 14 percent nonfoods, and 11 percent was for general store-wide promotion. Slightly over half the material observed in the food departments of the stores was originated by the store or its management. Manufacturers or distributors of brand products were the sources of about 37 percent of material and commodity promotional groups about 11 percent. Price cards were the most



extensively used promotional piece. Material supplied by commodity groups had its greatest incidence in the produce department.

(2) A study of producer groups and firms promoting farm products indicated that many of them tended to express their promotional objective in a general purpose context rather than in terms of specific goals or targets. Limited financial resources appeared to be a factor restricting the use of research in planning and evaluating their promotional effort. Great diversity was found in the types of promotional programs and in the amount spent for promotion. All groups placed a great deal of reliance on the advertising agency in planning promotion and in many instances in the development of promotion objectives. Application of improved practices and procedures in all stages of promotion activity appears to be desirable by most groups.

(3) An examination of advertising expenditure of food manufacturing, wholesaling and retailing corporations shows an upward trend in their expenditures between 1950 and 1961. Although food manufacture accounted for the major portion of total food advertising expenditures during this period, its share of the total declined from 78 percent in 1950 to about 75 percent in 1961. As a proportion of total food advertising, expenditures by the wholesale sector also declined---from about 12 percent in 1951 to an estimated 7 percent in 1960 and 1961. However, retailers' contribution to the total rose from 11 percent in 1950 to 18 percent in 1961. Many food industries such as bakery, canned fruits, vegetables, seafoods and dairy more than doubled their advertising expenditures between 1950 and 1959. Available evidence indicates that increased emphasis on advertising will be continued at the retail level but that total food advertising expenditure may lessen.

(4) Findings of research to evaluate the effect of major innovations in retail food store layout and product location on selling efficiencies for agricultural products indicate that both factors can be utilized to influence customer shopping and purchases. Conventional store layouts examined have proved more inducive to greater shopping coverage of the store by customers than modified layouts. Findings indicate that products that are purchased frequently or regularly by a sizeable proportion of customers, through proper location, can be used to pull customers to various parts of the store's selling area.

(5) An examination of space allocation procedures for frozen foods in 8 retail food stores in the Boston area indicated that total sales were virtually unaffected by either a 10 percent increase or decrease in total frozen food display space. A 20 percent increase in display space resulted in only a slight improvement in sales but a 20 percent reduction in space was accompanied by about a 12 percent sales decrease. A most important aspect of this work was the development of procedures for determining the contribution of product groups or individual items of frozen foods to net profits. Through the procedures developed food store operators are provided with decision making tools which can be used in allocating display space so as to reduce costs, and optimize sales and profits of the frozen food department.

(6) A preliminary examination of discount selling indicates that various types of food discounting are now in operation or developing. Some trade estimates place food sales by discount houses as high as \$2 billion annually (about 4 percent of total retail food sales). Operations of discount houses vary.

Some are closed door businesses while others are open to all. Some discount houses operate their food department as a concession, others as a component part of the discount house. A more recent development is the conventional supermarket that claims that its products are offered at discount prices. There is some disagreement among the trade as to the future of food discounting. Some predict phenomenal growth while others have reservations about its growth potential. However, several factors combine to indicate that the discount house supermarket could have lower operating costs than conventional supermarkets. Coincident to the growth of food discounting the following developments appear likely: (1) Food discounts will attract consumers who are willing to sacrifice service for lower prices; (2) competition in the retail field will become more intense if large variety and department store chains enter the field in number; (3) as price competition between the discount and conventional supermarket operators become more intense they will be forced to either operate more efficiently or to exert price pressures back to processors and growers or both; (4) as conventional supermarket firms appraise the implications of discounting and experiment with different forms of operations, these will be a slowdown in the construction of new conventional supermarkets; and (5) discount houses will locate in relatively lower population density areas than is preferred by conventional supermarkets.

(7) Measurement of foods stocks and nonconcentrated fluids held by retail food stores indicates a 15.5 days' supply of food and a 3.4 days' supply of fluids in food store inventories. A days' supply is based on requirements of 2,000 calories and 32 ounces of fluids per person per day for the population of continental United States. These are considered minimum requirements for emergency feeding programs. Slightly more than four-fifths of this food supply can be stored for relatively long periods and consists primarily of canned and bottled products.

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## AREA 4

### ECONOMICS OF TRANSPORTATION AND STORAGE

Problem. Four billion dollars are spent each year for transporting farm food products for human consumption. This does not include charges paid for transporting feed, fiber, and farm production supplies. Neither does it include payments to move these products to foreign markets nor amounts paid to move farm supplies to the farms. No one knows what these payments all add up to; but if they amount to \$5 billion annually, and 2 percent of this amount could be saved through better transportation, this would save shippers \$100 million every year. This saving, if it could be made, would benefit farmers and consumers through higher prices for producers or lower prices to consumers or both. These benefits would mean higher net farm incomes. Conversely, an increase of 2 percent in the aggregate transportation bill would adversely affect net farm income.

Economics of transportation--as related to farm products and supplies--is concerned with learning how farm products and supplies move from place to place and with finding ways to move them better--for less money.

Transportation economics is also concerned with the revenue requirements of the carriers. Their revenues must be adequate to enable them to provide the kind of transportation services needed by shippers. This means that the carriers' revenues must be sufficient to encourage them to finance new capital improvements as well as to meet operating and maintenance expenses.

The charges shippers pay and the costs carriers bear are directly affected by the Nation's transportation laws. Economic research can be used to forecast the probable effect of proposed changes in laws. Research helps industries, public policy makers, and others to make better decisions.

### USDA PROGRAM

The Department conducts a continuing program of research relating to the economics of transportation involving ten professional man-years. Research is conducted at Washington, D. C.; Bozeman, Montana; Manhattan, Kansas; and College Station, Texas.

#### A. Impact of Transportation on Marketing

Economic surveys are underway in the following areas:

1. Transportation of grain and grain products to, within, and from the South (in cooperation with the Southern Regional Grain Marketing Technical Committee); transportation of grain in the Northwest; grain transportation system in the Southwest (contracted, Agri-Research).
2. Transportation of fresh fruits and vegetables from California and Arizona.
3. Transportation of agricultural products by air freight.

These surveys are designed to:

1. Discern current modal and directional transportation patterns.
2. Evaluate the economic effects of these trends upon the various segments of

the marketing system.

3. Provide USDA and industry with guidelines for future research.

The grain transportation surveys outlined above, together with completed ones, provide geographic coverage for the continental United States except for the Middle Atlantic and Northeast portions.

The California and Arizona fresh fruits and vegetables survey is the first in a series of planned surveys analyzing transportation flow patterns and trends for all major producing areas.

B. Transportation Policy and Regulation

Three projects are underway, or planned, to determine operating characteristics of all types of trucking firms engaged in hauling agricultural commodities in interstate commerce.

One covers for-hire truckers engaged primarily in hauling exempt unmanufactured agricultural commodities. Another deals with trucking operations of manufacturers who own trucks for the primary purpose of collecting their supplies and of delivering their own products but, as an incidental part of their trucking operations, haul agricultural commodities for-hire for others. The third concerns carriers who are certificated by the Interstate Commerce Commission to haul commodities that are subject to that agency's economic jurisdiction but that also engage in hauling exempt agricultural commodities for-hire usually to provide payload on the homebound portion of round trips.

The above studies will provide information needed for a closer and more informed look into the economic effects of present and proposed transportation legislation and regulatory policy upon the Nation's agricultural marketing structure.

C. Transportation Rates

Rail freight rate indexes for major commodity groups have been computed by the Department for several years. The availability of published rail rate and traffic volume information makes calculations of these indexes possible. Comparable rate indexes for motor trucks, domestic inland waterway, and foreign ocean shipping are not constructed.

Motor truck transportation of exempt commodities is conducted at rates agreed to by shippers and carriers and data are not readily available for either charges made by the carriers for the service they perform or for the volume of traffic handled by these carriers. Preliminary plans are being made to collect truck rates.

Most agricultural traffic--both farm products and farm production supplies--moves over the inland waterway in bulk and at rates negotiated by the shippers and the carriers. The actual rates are not available.

Ocean rates for grain, the predominant agricultural commodity moving overseas, usually are negotiated for each individual shipment. Since this traffic moves by means of unscheduled service, rates reflect demand for service and supply of facilities and fluctuate freely depending upon factors relating to the



charter (size of ship, auxiliary services included, time of charter, availability of cargo space, etc.).

Attempts have been made on an exploratory basis to calculate a weighted average rate of ocean freight rates for periods covering the past two years. This work has brought to our attention many complexities and inconsistencies with which we have been unable to deal. Much additional information on operating and transfer costs are needed before a sound basis can be established for analysis and comparisons of charges made for transportation service over alternative routings available for overseas movements of agricultural commodities.

#### D. Transportation Bill

The rail freight rate and traffic data described above plus estimates of similar data for motor trucks are used to construct the Department's annual estimate of the Transportation Bill for domestically produced food. This figure is calculated each year and is used by other governmental agencies and private groups as well as in the Department's analysis of the marketing margin. The bill is published annually in Agricultural Statistics, the Agricultural Outlook Charts book, and Marketing and Transportation Situation.

#### E. Transportation Costs

There is a growing need for reliable statistical and financial data on exempt for-hire truckers, for domestic inland waterway carriers and for ocean carriers. The collection of that information for motor trucks and for domestic inland waterway carriers should be on the basis of logical geographical regions. This information is necessary if the Department is to be in a position to compare the costs of operation of these carriers with costs of those carriers for which information is available (i.e. rail, regulated highway and water carriers) and to suggest less costly means of transporting farm products and supplies. Without rather detailed information for each type of carrier, it is impossible to determine which type or combination of types can perform best the services needed by shippers of agricultural commodities and farm supplies to result in the most efficient marketing--both in terms of money paid by shippers for services needed and in terms of service itself.

#### F. Transportation Technology

The latest type of covered hopper cars is physically well suited for rail shipment of grain and grain products. A project to determine their economic competitiveness with presently used boxcars for shippers, carriers, and receivers is underway. A small project to keep abreast of air freight developments is underway and will be continued.

### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

#### A. Grains and Feeds

Eight Southern States and USDA are conducting regional study SM-11, Transportation of Grain and Grain Products in the South, in order to determine the costs, volume, and direction of flow by different modes of carriage and needed changes in transportation of grain and grain products within, from, and to the

South, especially as they are related to temporal and geographic price patterns, utilization, and storage. Each is a deficit State or consumes more grain during the course of a year than it produces, but each has local areas with temporary surplus at harvest time causing sharp seasonal price declines. The determination of proper location for storage facilities and processing plants requires careful scientific study of a number of factors.

Five grain-producing States (Ohio, Minnesota, Indiana, Oklahoma and Wisconsin) have been conducting studies under a regional project, NCM-19, Pricing and Trading Practices for Grain in the North Central Region, on truck transportation of grain and its effect on grain movements, pricing, and costs; changes in transportation of grain and its impact on marketing channels, pricing policies, etc.; the economic implication of recent highway and seaway developments on the operation of grain and supply agencies, location of grain facilities, and costs. These States and the Southern group freely exchange information obtained.

Massachusetts is concerned with the structure and relationship of freight rates on feed to poultry feed prices in the East. Oregon has been studying sources and methods of obtaining grain and reporting truck movements of grain and learning the classes of wheat being milled into flour.

#### B. Livestock and Livestock Products

Regional research is currently being conducted on the economics of transportation of livestock and livestock products in the Southern, Western and North Central regions. The research projects in this area represent well integrated and coordinated State contributions to two regional research projects. In the South, with seven States participating, SM-23, An Analysis of Livestock and Meat Movement in the Southern Region, involves a study of meat and livestock movements which takes into consideration volume, direction and seasonal variation in movement, inefficiencies in movement, and the role of transportation costs and their implication upon the location of production and processing facilities. In the West, eight States are participating in regional project WM-37, Economics of Transportation of Livestock and Meats in the Western Region. This is concerned with an examination of the structure of rail and truck rates which prevail in the movement of livestock and meats, the equity of rates on inter- and intra-State movements, the costs and efficiency of shipping livestock and meats by truck and rail, and the effect of transportation costs on location of production areas and processing centers. Progress is being made toward combining forthcoming results of research in the South and West on the transportation of livestock and livestock products, with similar research to be conducted in the North Central region with perhaps some Northeastern State stations cooperating. In addition to the above, the Missouri station is making an analysis of rail and truck transportation costs for interregional shipments of livestock and meats, and Nevada is conducting research on controlled experiments in shrinkage resulting from transportation of cattle and sheep, and the cost of regain.

#### C. Poultry and Eggs

One northeastern station has been assigned major responsibility for regional poultry and egg marketing project NEM-21, Adjustments Needed in Marketing Northeastern Poultry Products. This study relates to the impacts of feed and poultry product transportation rates and costs on the relative competitive

situation of the poultry industry of the region.

#### D. Economic and Technological Research

Most of the economic research by the transportation industry is related to the particular problems of individual companies in protecting their traffic or attracting new traffic. Relatively little economic research effort is devoted to national transportation problems or the overall transportation system of the country. The industry does give some financial support to transportation economics research through the universities and through carrier organizations. The research by shipping organizations and trade associations is mainly for purposes of opposing or supporting proposals which effect their specific competitive positions. Numerous segments of the agricultural community rely completely on Department economic research for information and recommendations regarding transportation.

In the field of technological research, the railroads rely heavily on suppliers of equipment. The adaptation of improvements is slow, partly due to the absence of economic evaluation by the carriers. Such evaluation by the Department frequently points the way to economies, ratewise or servicewise, for the movement of agricultural commodities. This does not apply to other types of transport to the same degree, but there are numerous areas of untouched research potential where the Department's efforts can and do bear fruit. Estimated annual expenditures are equivalent to approximately 5 professional man-years.

### REPORT OF PROGRESS FOR USDA AND COOPERATIVE PROGRAMS

#### A. Highway Transportation

1. Highway Carriers Engaged Primarily in the Business of Hauling Exempt Agricultural Commodities. A preliminary analysis of responses to mail questionnaires and of personal interviews of motor carriers engaged primarily in hauling unmanufactured agricultural products in interstate commerce indicates that operators in this economically unregulated segment of the transportation industry are a relatively stable group. Our preliminary analysis shows that even though many entering this type of for-hire motor trucking do not survive, once established they tend to stay in business for considerable periods. Responses indicate that more than one half of the established ones have been in business for more than ten years. Over 15 percent had been in business for more than 25 years.

Information collected also demonstrates that the economic and geographic freedom these carriers enjoy has enabled them to supplement regulated rail service and to benefit agriculture. The 1960 data show that they are active in all parts of the country and that they haul predominantly grain, perishables, and livestock. Many of these operators combine motor trucking with farming. Some act as brokers for shippers and other carriers. For this service they collect a fee. The transportation services provided by these carriers clearly seems to be necessary and unique in that they report that their principal competitors are other motor carriers like themselves rather than rail or waterway carriers.

2. Operating Costs of For-hire Carriers of Exempt Agricultural Products. A



pilot survey of twenty-five highway carriers operating in Virginia, Delaware, and Maryland leads to the tentative conclusion that for-hire motor truckers who engage primarily in hauling unmanufactured farm products are able to provide service to shippers for considerably less than regulated carriers. Our preliminary summary shows that charges made for services provided by these carriers are in the neighborhood of 10 percent lower than those available to shippers for regulated carriers.

3. St. Lawrence Seaway Transportation. A broad program is underway to measure the impact of the improved Great Lakes--St. Lawrence Seaway--on marketing of agricultural products. Preliminary findings indicate that changing shipping patterns on the Seaway may cause total tonnage by 1968 to fall short of expectations by some 20 percent. Among the major bulk commodities grain, and perhaps iron ore, will likely dominate future Seaway traffic.

Agricultural commodities constituted 42 percent of the 11.8 million tons of Seaway traffic in 1958, 38 percent of the 20.4 million tons of traffic in 1959, and 43 percent of the 20.3 million tons of traffic in 1960.

4. Air Freight Transportation. The principal air freight carriers are being surveyed annually to determine the kinds and quantities of agricultural commodities hauled by them. More than 26,000 tons of agricultural commodities were moved by five major airlines during 1961. This was a substantial increase over the amounts moved in 1959. Principal commodities handled by volume were cut flowers, fresh fruits, vegetables and horticultural products.

Published air freight rates and carriers' costs are studied with a view to comparing these data with comparable data for surface carriers. Air freight rates averaged about 20 cents per-ton mile in 1961--about the same as rail express. Truck rates were about 6 cents. Many airline officials believe that new turboprop planes designed for cargo and the use of improved ground handling facilities will reduce costs to 15 cents per-ton mile or less in the near future if the volume of traffic increases and if the available plane capacity is more fully utilized.

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## AREA 5

### ECONOMICS OF PRODUCT QUALITY

Problem. One of the earliest measures undertaken by Government to improve the economic well-being of farmers was to establish standards for farm products. This assured the dependability of quality and strengthened United States farmers' competitive position, especially in foreign markets. Technological control of product quality is increasing and economic understanding of marketing processes is growing. Consequently, the grading of farm products can be expanded and refined to make it more effective. Economic aspects of the properties of farm products should be evaluated as a basis for improving existing standards and developing new ones. The impact of Government grades on market practices and market structure should be analyzed as a basis for answers to questions of public policy related to Government grading programs.

### USDA PROGRAM

The Department's program of basic and applied research on the economics of product quality includes study of the problems of 7 different commodity groups. Work on all commodities is carried on in Washington. Work on protein content of milk is being done at Davis, California, under contract with the California Agricultural Experiment Station. Studies of cattle shrinkage are cooperative with the Colorado Agricultural Experiment Station; of cotton quality with North Carolina Agricultural Experiment Station; and of tomato quality with the Florida Agricultural Experiment Station.

The work on tomato quality at Gainesville, Florida, was completed during the year.

The Division devoted 14.5 professional man-years to the study of economics of product quality in fiscal year 1962, distributed as follows: Dairy products 1.3; poultry and eggs .6; livestock and livestock products 5.5; fibers 5.9; fruits and vegetables 1.0; and grains and feeds .2.

### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

A 1961 study found that the State experiment stations were devoting 16.7 professional man-years to the study of the economics of product quality, distributed among commodity areas as follows: Fibers 1.4; fruits and vegetables 2.5; grains and feeds 1.8; livestock and livestock products 5.3; poultry and eggs 1.6; and other farm products (mostly cut flowers) 4.1.

Much of the industry work relating to the economics of product quality has been done by the meatpacking industry. Large national packers maintain taste panels to study consumer acceptance, evaluate brand and promotional policies, and market test new products. One packer has developed extensive studies of genetic and feeding factors affecting quality of meat and the relation of live animal characteristics to quality. One large packer has

developed preslaughter tenderizing process by injection of meat tenderizer, for which effectiveness is being tested. American Meat Institute Foundation is both studying and supporting university study of meat chemistry and value of meat in the diet and health. About 15 man-years are involved.

## REPORT OF PROGRESS FOR USDA AND COOPERATIVE PROGRAMS

### A. Dairy

1. Variability of Butterfat Tests. The establishment of accurate butterfat tests for milk producers will be greatly facilitated by a statistical analysis of the inherent day-to-day variability in the butterfat content of the individual producer's milk and the accuracy to be expected of various sampling and testing procedures. One report dealing with the effect which selected factors have on the accuracy of the individual producer's butterfat tests has been published. A second report is being readied for publication. This report compares results of individual producers' tests made by using (1) composite sample tests, (2) daily fresh sample tests, and (3) varying numbers of random or stratified fresh sample tests. (ME 2-17)

2. Quality-Price Relationships for Butter. The relationships of prices and grades of butter at the retail level are not consistent.

Two sets of butter samples purchased in Wilmington, Delaware, stores were graded. About two-thirds of the butter sold in Wilmington stores was grade A or AA. The average quality was higher in chainstores and large self-service independents than in other types of stores. On the average, prices were not related to grade level. Rather, prices tended to reflect the amount and type of service given to consumers. Considerable variation in grades occurred within brands of butter, without corresponding variations in price. Flavor characteristics varied within brands, without a consistent relationship to price. (ME 2-36)

3. Methods of Determining Protein and Solids-Not-Fat as a Basis for Purchasing Milk. This work is to: (a) Select the dye-binding method of measuring protein content of milk that is best adapted for use in commercial milk plants; and (b) determine day-to-day variability in protein and solids-not-fat content of herd milk as a basis for sampling routines for producers' milk deliveries. Preliminary work on the amido black procedure has been done including spectral analysis, the effect of pH, dye concentration, equilibrium conditions, time and speed of centrifugation, time of shaking, dilution, accuracy, and precision. The absorption maximum was found to be about 615 m $\mu$  rather than 675-690 m $\mu$  as used by the Dutch workers. The contractor is of the opinion that sufficient is known about the dye-binding methods to indicate that amido black is the method of choice and additional work with orange G or buffalo black is unnecessary. (ME 2-38)

### B. Livestock

1. Economic Effects of Distribution of Lamb by U. S. Grades. Findings suggest that Federal grades enhance the competitive position of smaller packers, wholesalers, and retailers by providing quality protection (in both procurement and sales), reduced procurement costs and provide a common language for



negotiations. The competitive position of packers relative to each other and the nature and structure of the market in which they sell are major determinants of the grading policy they follow. Independent packers (except for kosher killers whose lamb must leave the coolers before it is firm enough to grade), generally favor Federal grading because it improves their market position. National packers have brand names of their own and oppose Federal grading per se. Wholesalers in all markets tend to merchandise Federal grades principally because the hotel and restaurant trade, now an important part of the wholesaler's business, demands it. Most of the lamb sold at retail in the U. S. is sold in the 2 major lamb consuming areas, the Pacific Coast area and the Northeast.

Most of the lamb consumed on the west coast is slaughtered there (mostly by independent packers) and 82 percent was U. S. graded in 1960. This area has grown rapidly in recent years and food distribution channels are more direct, retail stores are larger, and chains are more important, and require a more standardized product. Federal grades are promoted and advertised, and have become widely accepted as a label of quality.

In the Northeast, the national packers are dominant (27 percent of the lamb was U. S. graded in 1960). They actively promote private brands and supply Federal-graded lamb only when it is demanded and usually at a higher price. Food distribution channels and retail outlets here tend to the pattern of 20 years ago with important wholesalers and numerous small retailers. In both the Northeast and Pacific areas, most retail chains and supermarkets follow high-and-low price policies on lamb, many selling as much as 50 percent of their lamb volume in a few special sales. Because they do not feel compelled to go into the lamb market to buy in volume on a regular basis, they are in an advantageous bargaining position relative to packers, even though the market is more concentrated at the packer level.

The 1960 change in Federal grade standards for lamb has increased their use. Those who found U. S. Choice too fat previously are now more satisfied. However, the use of U. S. grades will continue to be largely determined by the changing "balance of power" in each market. Further increases in the importance of independent packers will tend to increase the use of Federal grades for lamb, but under the present market structure the availability of Federally-graded lamb at retail will continue to depend on the policies of the large chains. Federal grades also serve as product specifications which should shape production decisions. Lambs have been marketed earlier and lighter since the change. Market demand increasingly discriminates between quality levels. Producers should not ignore this trend if they wish to maximize the potentials of lamb, whatever these may be. (ME 2-20)

2. Improved Live Hog and Carcass Grading and Pricing. The relationships of live and carcass weights, measurements, and evaluations to yields and quality characteristics of wholesale cuts and boned and defatted cuts were studied in order to establish a basis for (1) determining appropriate paying price differentials between grades, and (2) evaluating and improving the grade standards. In general, the current standards for barrow and gilt carcasses are quite good. The standards rely heavily on backfat thickness and weight or length. These factors are good indicators of the percent of lean cuts - and percent of lean cuts, for a given weight or length, is very closely associated with value. Value differences between grades were computed under different price

and grade consist situations so that paying price differentials actually used can be evaluated. (ME 2-33)

3. Grade Composition of Market Hogs. A reliable national estimate of slaughter barrow and gilt quality was needed as a basis for analyzing various aspects of the hog quality problem.

One grader spent a year visiting plants throughout the U. S., which had been selected by systematic sampling methods. The plants in the sample were each visited twice. Of the barrow and gilt carcasses, 33 percent graded U. S. No. 1; 39 percent graded U. S. No. 2; 26 percent graded U. S. No. 3; 2 percent graded Medium; and less than one-half of 1 percent graded Cull.

It appears that 1 grader can spend enough days in enough plants to give adequate national estimates for a year's average consist. It was not possible to determine whether any region was definitely above or below the national average. At least 2 graders would be needed for acceptable regional and seasonal estimates. Other results of the study include distribution of barrow and gilt carcass lengths and backfat thicknesses by grades, and the distributions for sows.

A grader spent 2 weeks grading hog carcasses in Canada. The preliminary estimate of 1962 Canadian hog grade consist, in terms of U. S. grades, is 56 percent U. S. No. 1; 27 percent U. S. No. 2; 5 percent U. S. No. 3; 10 percent Medium; 1 percent Cull; and 1 percent Other. (ME 2-40)

4. Effects of Shrinkage on Pricing Cattle. Better knowledge of the shrinkage in cattle sold from feedlots, as compared with the arbitrary allowance or "pencil shrinkage" now used, will provide a basis for more efficient pricing. A study of the factors affecting shrinkage of fat cattle marketed from northern Colorado feedlots direct to packers and through the Denver stockyards will provide insights into this problem. No findings are available yet. (ME 2-30)

### C. Poultry and Eggs

Effects of Egg Quality on Marketing Costs and Returns. This study will provide information on the effects of various production and handling practices on producer returns and of variations in egg quality on marketing costs. No findings are available. (ME 2-49)

### D. Fibers

1. Economic Evaluation of Cotton Quality. Changes in cultural, marketing, and manufacturing methods have created an urgent need for information on the effects of these variables upon the quality and use value of cotton. Many textile manufacturers claim that some production, harvesting, and ginning practices that appear to benefit cotton producers through higher prices or lower costs actually damage cotton fibers, increase manufacturing costs, decrease qualities of textile products, impair the competitive position of U. S. cotton and cotton textiles, and indirectly place a burden on the cotton grower.

Data developed from 6 spinning tests at the USDA Pilot Spinning Plant, Clemson, S. C., indicate that intensive cleaning procedures at gins reduce the amount of foreign material, raise the grade, leave classers' determination of staple length unchanged, and reduce outturns. Drying to very low levels and use of lint cleaners reduce the mean array length and increase the proportion of short fibers but have no significant effect on fiber strength. Extreme cleaning practices also increase neps in card web, reduce yarn appearance, and apparently lower the value of end products. Generally, the deleterious effect of excessive cleaning practices on fiber properties is associated with lower performance and higher manufacturing costs. However, in some instances, reverse effects have been noted, suggesting the presence of other variables affecting quality not yet isolated or measured. Market evaluation studies, including the large study of 3 lint cleaners in 1961-62, indicate that these severe cleaning practices frequently result in increased returns per bale to farmers, particularly for lower grades of cotton and during seasons when differentials are large.

Additional work underway includes (1) development of basic data on mill operating organization and quality relationships, and (2) development of a mathematical model of the cotton manufacturing process to be used as a guide in translating performance data into use or market values. (ME 3-13)

## 2. Changes in Quality and Value of Cotton Bales and Samples in Storage.

Information on representativeness of samples from cotton stored for extended periods will help to determine the feasibility of reducing both the number and frequency of sampling cotton bales. If either cut samples or samples drawn by mechanical, automatic samplers at gins prove to be as representative of the cotton in a bale throughout the marketing and storage period as samples cut at any later time from a bale, much time and expense in taking and classing samples can be avoided as a bale moves through marketing channels. Also, cotton bales will be damaged less.

About 1,000 bales stored at 4 locations in the fall of 1959 were resampled at regular intervals over a 2-year period. New samples were compared with original cut samples stored with the bales to determine changes over time as well as differences between new-cut and stored samples. In addition, 2 mechanical samples were drawn from approximately half the bales--1 classed prior to storage and the other at the end of the 2-year period. Preliminary analysis of the classification, fiber measurements, and spinning data show marked differences between areas in quality changes over time but nonsignificant differences between automatic and cut samples taken at the same time and stored under the same conditions. (ME 3-19, ME 3-41)

## E. Fruits and Vegetables

### 1. Economic Evaluation of Grade and Size Standards for Mature Green

Tomatoes. This research will provide information to aid in efficient price determination and reduce costs in the marketing of mature green tomatoes. Experiments conducted in 11 large supermarkets in the Dayton, Ohio, market area were designed to examine the preference patterns of consumers for varying grade and size characteristics of tomatoes.

Consumers do not discriminate among all current grades and sizes of tomatoes. They did not distinguish among tomatoes that were not greatly different with



respect to size or grade or some combination of size and grade. For example, in a comparison of the sales of the U. S. No. 3 grade size, 5 x 6 tomatoes with the other 10-grade size combinations tested, consumers found the 5 x 6 U. S. No. 1 tomato superior. However, they regarded the 5 x 6 U. S. No. 3 tomato equally as good as the 5 x 6 and 6 x 6 sizes of the U. S. No. 2 grade. Thus, fewer grade and size combinations than are in current use may be sufficient for efficient marketing of tomatoes. (ME 3-49)

2. Marketing Radiation Pasteurized Fresh Strawberries, Peaches, Citrus, Grapes and Tomatoes. A study of the economic feasibility of marketing radiation pasteurized products and of the impacts on market supplies, prices, methods of marketing, and the structure of fresh strawberry markets began in 1962 and no findings are available. (ME 3-74)

#### F. Grains and Feeds

Economic Evaluation of Alfalfa Hay Grading. Previous research indicates that current methods and standards for grading alfalfa hay are not fully satisfactory in facilitating accurate pricing and efficient marketing. In the West, the marketing of hay is expanding on a commercial basis, and information is needed on the requirements of an adequate hay-grading system to meet the needs of both farmer buyers and farmer sellers. No findings are available. (ME 3-58)

#### G. Other Farm Products (Tobacco)

Tobacco Quality and the Pricing System. An accurate determination of tobacco quality components and their relationship to economic value is basic to efficient marketing of tobacco and accurate pricing. The purpose of this new project is to determine the interrelationships among tobacco prices, growers' market conditions and tobacco quality factors, and to suggest improvements in present grading and pricing procedures. Work is just getting underway. (ME 3-82)

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## AREA 6

### MARKETING COSTS, MARGINS, AND EFFICIENCY

Problem. Agriculture and agriculturally-linked industries in the United States have made great progress in recent decades in increasing efficiency and reducing costs. By any standards, except perhaps our own, American agriculture and the American system of marketing farm products are highly efficient. Both are admired throughout the world. Without doubt, public-sponsored research has contributed greatly to this efficiency and has accelerated progress in agriculture and agricultural marketing. Public investment in research and education, like private investment in physical facilities, is useful for further productive operations and the returns to farmers, consumers, marketing firms and others have been high. Research on marketing costs, margins, and efficiency long has been an important part of the program of public-sponsored research on marketing farm products. The demands from private firms and industry and trade groups for results of this type of research long have exceeded the capacity of public agencies to supply them. In most industries rates of development and adoption of new economic and technological innovations remain high and producers and marketing firms continue to face substantial adjustments to remain competitive. As a result, managers of marketing firms need accurate and unbiased information on costs, operating margins, cost standards, and factors affecting efficiency as aids in making sound decisions that greatly affect the efficiency and profitability of their operations, their ability to compete successfully with others and with other products, returns to farmers, prices to consumers and the public welfare. Research in this area also has important benefits to officials in public agencies responsible for public programs affecting agriculture and to teachers and extension workers. In our present highly dynamic economy trial and error methods of determining costs and improving efficiency are much too crude and costly to be tolerated. Furthermore, only a few agricultural marketing firms are large enough to afford the costs of a competent professional research staff. Therefore, the need for research in this important problem area must continue to be met primarily by public agencies.

### USDA PROGRAM

The Department has a continuing long-term program of research in marketing margins, costs, and efficiency designed primarily to provide useful information on the amounts and trends in marketing margins, costs of marketing, labor and equipment requirements, cost standards, economies of scale, and other factors including marketing practices, affecting costs of marketing through all important trade channels and types of firms and for all farm products marketed in commercial volumes. Most of the research is highly pragmatic, or problem-solving in nature, but a limited amount of research is devoted to development of improved research techniques. Nearly all research is conducted by professional agricultural economists. However, several marketing specialists are employed and a substantial portion of the studies are conducted in close cooperation with agricultural engineers and members of other disciplines. In nearly all studies close cooperation is maintained with industry and trade groups and with individual private firms that

generously provide essential data from their records and make their plant facilities available for observation and the conduct of various market tests. Although most of the research is conducted by personnel in Washington, D. C., a considerable part of the work is done by USDA professional staff located at field stations in several States. These agricultural economists work closely with State agricultural experiment stations which also share a part of the expense of the cooperative studies.

The USDA scientific effort devoted to research in this area, including cooperative agents paid mainly from Federal funds, total 44.3 professional man-years. Of this number, 3.8 were devoted to dairy products, 7.3 to poultry and poultry products, 4.8 to livestock products, 7.5 to cotton, 2.0 to wool, 2.5 to grains and grain products, 2.0 to feeds and seeds, 0.5 to citrus fruits, 2.0 to deciduous fruits, 0.5 to vegetables, 1.0 to sugar, 4.0 to oil-seeds and peanuts, 2.4 to tobacco, and 4.0 to studies involving combinations of products. The program involved 70 line projects during the 2 years ending September 30, 1962, at which time 48 were still active.

#### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

State experiment stations in 1961 reported a total of 27.2 professional man-years devoted to research on marketing costs, margins, and efficiency. This is slightly less than two-thirds of the total Federal effort. Compared with the USDA program, the States tend to emphasize research on the animal products and grains and feeds somewhat more and on other farm products somewhat less.

The amount of research conducted by private firms on marketing margins, costs and efficiency is not known but it probably is small. Only a few extremely large firms can afford the cost of the essential professional research staff. Results of such privately conducted research rarely is published for obvious reasons. But even if results were published the social and economic benefits of publication would be limited because these private studies tend to deal with special cases and problems and analyses are based mainly on data for a single firm. Thus, the many thousands of smaller marketing firms and the millions of farmers and consumers must depend on results of public-sponsored research.

#### REPORT OF PROGRESS FOR USDA AND COOPERATIVE PROGRAMS

Highlights of progress are stated below by commodity groups for all research studies for which reportable results are available. Of the 70 research projects in this area, statements are presented covering final or preliminary results of 44 projects. No statements of results are made on the remainder primarily for two reasons: (1) The projects were initiated recently in the reporting period and while much actual progress has been made on the research, specific research findings and conclusions cannot be presented. (2) A few projects were active for only a short time during the period, mainly to complete publication of research reports, the highlights of which were reported 2 years ago.

Among the comparatively new active projects are studies on the following problems:

A study on the costs and efficiency in wholesaling frozen foods to establish a self-maintaining system of operating cost data collection, analysis and dissemination for the purpose of helping wholesalers to increase the efficiency of distribution.

Research on the economics of inventory control and space management to develop decision models and guidelines for inventory control and better space management in warehouses handling foods and other agricultural commodities.

A regional study in cooperation with State experiment stations in the Northeast dealing with several economic factors affecting the efficiency of marketing livestock in the region.

Three regional studies in cooperation with State experiment stations concerning (a) appraisal of the competitive position of the South in marketing eggs and broilers, (b) coordinated egg production-marketing programs in the North Central States, and (c) economic and institutional adjustments needed for efficient marketing of poultry products in the Northeast.

Analysis of marketing margins and practices for fluid milk in regulated markets.

A study of capacity and flexibility of facilities in milk manufacturing plants to help plant operators in making decisions relative to type and capacity of facilities to secure the degree of flexibility of facilities needed, and the costs and benefits of flexibility and diversification of operations.

Continuing collection and analysis of marketing margins, practices, and trends for fats and oils in the principal end products of these industries.

Research on labor utilization in cottonseed oil mills to evaluate the economics of labor saving equipment and operating practices that affect labor efficiency in these mills.

A contract study with the Kentucky Agricultural Experiment Station to determine costs and possible improvements in efficiency in the operation of tobacco auction markets.

A contract study with the Ontario (Canada) Agricultural College to evaluate the costs and practices in selling tobacco at Canadian auction markets all of which use the "Dutch-Clock" method of auctioning.

A continuing analysis of peanut market patterns and sheller's margins, prices, and outturns for the purpose of assisting Department officials and industry advisory groups in determining the direction and amounts of needed adjustments in price differentials under the peanut price support program.

Research using linear programming models to identify the most profitable ton of peanuts for shellers in terms of grade characteristics and with varying prices and to establish standards of efficiency in shelling plant operations.

A continuing analysis of trends in marketing costs, margins and practices in the marketing of sugar.



Research in cooperation with the University of California (Berkeley) to determine the costs and possible means of increasing efficiency in distribution of bread with special attention to comparison of the costs and benefits of alternative distribution system including deliveries of frozen bread.

A technical-economic analysis of costs of operating grain elevators including economies of scale, development of cost standards by functions, and relation of specific practices and types of facilities to operating efficiency.

Research under contract with Montana Agricultural Experiment Station on costs, practices, economies of scale, and factors affecting efficiency of grain storage and handling in the spring wheat area to assist the elevator industry in the region in making decisions on how best to adapt facilities, market organization, and operating practices to changing marketing conditions.

Study of the market organization, plant volume, practices, and efficiency of the rice milling industry including the development through technical-economic methods of labor input-output relations and cost standards.

Analysis of the feasibility of grading, sorting, and baling wool in principal wool producing areas for the purpose of helping the wool industry decide if such a change in traditional practices would increase the efficiency of marketing wool. (In cooperation with the Texas and Ohio Agricultural Experiment Stations.)

Research on the organization, operation and efficiency of wool pools to determine the conditions and standards of organization and operation pools need to meet to achieve substantial operating efficiency.

A study of the costs of warehousing and related services for cotton emphasizing development of cost standards of receiving, storing, and compressing, and handling cotton.

#### A. Dairy

There is widespread concern and demand for information on the amount of, and trends in, costs and margins for processing and distributing milk. Eight quarterly publications, presenting costs and margins for fluid milk processing and distributing, were issued during the past 2 years. These include special analyses on (1) sales outlets and products; (2) personnel costs and labor efficiency; (3) work week, earnings, and rates of pay; and (4) wages, labor output, and unit costs of labor. Retail sales continued to decline as a percentage of total sales. Homogenized milk accounts for an increasing percentage of total sales and low fat items are growing in importance. Personnel costs increased during the 1955-61 period; greater efficiency in the use of labor has been more than offset by increases in wage rates. Most fluid milk plants now operate on a 40-hour week. Output per man-hour is related to rate of pay. In most cases, high productivity occurs in plants which pay high wage rates, indicating that either high wages provide the incentive for use of labor-saving equipment and methods, or that efficient equipment and methods provide a basis for higher wages. Processing costs are inversely related to scale of operations. Multiple-quart containers account for an increasing proportion of the fluid milk business. Over 20 percent of all fluid milk products are consumed away from home; major

non-home consumption is in eating places and institutions. For a large sample of milk distributors average net sales receipts averaged \$11.37 per 100 pounds of milk processed in 1961, raw product costs were \$5.97, gross margins were \$5.40, total operating costs were \$4.97, and net margins averaged 43 cents prior to income taxes. Although gross margins in 1961 were about 10 percent higher than in 1955, net margins were a cent a hundredweight lower. Salaries, wages, and commissions at \$2.67 per 100 pounds of milk processed were nearly 20 percent higher than in 1955. Special analyses from the quarterly reports have been put into one publication which will be issued soon. Comprehensive analyses are planned to cover: (1) Amount and relationships of changes in sales value, costs of raw materials, and the individual elements of operating costs; (2) products handled; (3) sales of homogenized milk (container sizes and sales outlets); (4) growth in size of milk distributors' plants; (5) seasonal variations in the fluid milk business; (6) selling prices (both nominal and realized); (7) increases in costs and relative costs of retail and wholesale sales; and (8) relative efficiency of glass, paper, and glass-paper operations.

Seasonal variation in supplies of milk cause labor costs in manufacturing milk plants to be higher than if there were less variation. The basic labor policy of the dairy manufacturing plants studied by Purdue University under contract with the Department is one of maintaining the same-sized labor force throughout the year with the addition of seasonal employees during the summer. Under these conditions, only meager reductions in labor costs can be made by evening out production at the annual average level. Additional savings can be obtained through using equipment near capacity levels throughout the year, i.e., evening out plant receipts at volumes close to full capacity. A preliminary draft of a report of this study is now being revised for publication.

The dairy industry in the South must adjust to developments in production, processing, and distribution of milk as well as to changes in the Southern economy and population. To adjust efficiently and rapidly, the industry needs analyses of the probable factor changes and technological developments to show effects of these changes. Supply and movement data have been collected. A regional report has been written showing by volume the present (1959) movement pattern of Grade A fluid milk by area of origin and area of destination for both producer supplies and product distribution. These data are being analyzed to determine the least-cost movement pattern for producer supplies moving to the processing centers. Using the Reactive Programming technique the distribution data have been analyzed to show the movement patterns which result in equal net prices to processing areas and maximum net revenue to processing areas assuming given processing and distribution costs and demand functions. This analysis shows some shifts in the movement pattern. Producer supplies of Grade A milk and aggregate demand for fluid milk have been projected for various time periods by economic areas within each State. These data are being analyzed to show movement patterns which result in maximum net revenues to areas. These results will provide guidelines to the dairy industry. At least 3 regional reports are planned showing the results of the analysis. Comparisons will be made between the present pattern of milk movement in the South and the movement pattern shown by the least-cost, maximum revenue analysis. Analysis of milk movement under alternative market structures and price relationships will be completed. Economic models will be synthesized based on alternative levels of supply and demand and specified technological developments which will show numbers,

location, and size of firms (milk producers and processors) necessary in future time periods for an efficient industry. Also a report will be written describing institutional factors which affect milk movement patterns with implications of such factors considered.

## B. Poultry

Results of an incomplete study of commercial hatchery costs and operating practices indicate that substantial cost reductions are possible particularly from economies of large scale and economies of operating near capacity levels for longer seasons. Most of the economies of size in broiler-chick hatcheries are achieved with an incubator capacity of 500,000 eggs. In a sample of North Carolina hatcheries studied, average costs per chick range from only 1.6 cents to 6.0 cents. However, operating cost estimates for model hatcheries based on studies in New England and North Carolina range from 2 cents per chick for a hatchery producing about 1.5 million chicks annually to 1 cent per chick at 15 million chicks per year. The number of hatcheries in the U.S. has declined more than 50 percent in the past 20 years, and the average size of firm has increased. Hatcheries are now operating with a higher rate of use of capacity, for longer seasons, with less hatching on a custom basis, with greater reliance on contract flocks for supplies of hatching eggs and with more integration with other elements of the poultry industry. About 40 percent of a national sample of 643 hatcheries are franchised by breeders to hatch and sell designated strains of chicks or poults within particular areas. Four reports have been published on this study and other manuscripts are being written.

In a study of the economic requirements for development of a commercial egg industry in the South, models of 7 different egg candling and distributing plants have been developed. For consumer graded and cartoned eggs, total costs of operation range from \$1.77 to \$1.92 per case. Costs decrease as size of plant increases from 7 cases an hour to 120 cases an hour. Increasing productivity of labor and, hence, decreasing labor costs per case explain nearly two-thirds of the variation in labor costs. Labor costs are about a third of total costs and packaging materials about 40 percent. Vertical integration and contract production programs lead to better coordination of production and marketing, with resulting possible savings, by reducing the seasonality of production and plant operations. Additional, more comprehensive, reports on this research are in preparation.

An appraisal of ways to increase the efficiency of egg assembly in the West North Central Region reveals that savings of 15 to 45 percent may be accomplished through realignment of routes, the use of set-in stations, the recognition of paying price differentials based on volume picked up and more attention by management to procurement and assembling programs. At the time of the study, total assembly costs per case for 20 routes averaged 38.6 cents. The lowest total cost per case was 20.0 cents, the highest 53.1 cents. Labor costs per case averaged 20.0 cents with a low of 10.2 cents and a high of 30.9 cents. Truck costs averaged 18.6 cents per case with a low of 5.7 cents and a high of 36.2 cents. Total costs per mile including truck and driver averaged 22.5 cents with a low of 17.3 cents and a high of 37.1 cents. Of the total volume of eggs handled by 7 midwestern assemblers, 46 percent came from producers with 4 cases or more of eggs per pickup. Average assembly costs per dozen ranged from 3.5 cents for less than



1 case picked up per farm down to about 0.25 cent per dozen for 4 or more cases. Paying prices reflecting such differences in assembly costs might encourage more farmers to produce larger volumes of eggs per farm and help plants to reduce egg marketing costs. A manuscript is in process of clearance.

A study designed to appraise the possibilities for reducing costs of assembling and processing turkeys, both from the standpoints of operating efficiency and industry structure is nearing completion. Data from 25 plants show that economies of scale exist in turkey processing, and that costs and returns are also affected by seasonality of operations, market classes of turkeys handled, supply sources and market outlets. Costs of processing turkeys in frozen, ready-to-cook form range from 6.6 cents per pound in small plants to 5.4 cents per pound in larger plants. Operating costs per pound are lower for good quality heavy young hens and toms than for breeders and fryer-roaster turkeys. Costs can be reduced by increasing plant size toward the optimum level, better utilization of capacity, substitution of equipment for labor, and better organization of the working force and supervisory activities. Efficiency in assembly of turkeys is affected by truck and crew size, length of haul, size of birds, catching and loading arrangements, and weather conditions. Further work on the coordination of production and marketing functions in the 10 leading turkey States is in progress. Analyses of the economic consequences of alternative structural arrangements have been initiated. Reports on costs and economies of scale in processing turkeys and on assembly systems are in preparation.

In a study designed to develop least-cost systems of performing production, marketing, and supply functions in the broiler industry in New England, reports have been issued on the relative profitability of alternative production, processing, and selling programs of processors under average market price levels, and on the possibilities for reducing live assembly costs. Under the price relationships prevailing in New England during recent years, direct contracting between the plant and the grower was the most profitable method of procurement. Market prices of live broilers and costs of growing varied seasonally and inversely. It pays plant operators to operate at capacity rather than to vary volume with seasonality of demand and prices. If the additional costs can be recovered, a partial shift toward frozen and further-processed products would even out prices and facilitate more orderly marketing. Size of firm and density of the supply areas are major factors affecting assembly costs. If poultry is available at the rate of 100 pounds per mile of truck travel, unit costs in assembly decline from 0.90 cent per pound for a firm handling 1 million pounds per year to 0.47 cent per pound at 50 million pounds. Increasing the pounds per mile of truck travel to 1,000 lowers unit costs to 0.60 cent per pound for 1 million pounds and 0.35 cent per pound at 50 million pounds. Costs of assembling live poultry in New England can be reduced from \$4.6 million to \$2.9 million by capacity operation in fewer firms with exclusive supply areas. Synthetic models have been used to adapt the results of live assembly cost studies to the development of planned systems for integrated organizations. The institutional characteristics of the New England hatchery were summarized, and a manuscript has been prepared on costs of hatchery operation and chick distribution. Seven model feed mills are being developed synthetically to study economies of scale in feed milling, and studies of the costs of distributing feed are underway. Work in the feed milling and distributing phases will be completed.

An analysis of the costs of assembling hatching eggs will be made. Least-cost systems of distributing processed poultry to retail organizations will be evaluated. Evaluation of total systems, including egg supply flocks, broiler production units, hatcheries, feed mills, and processing plants, will be completed. These will aggregate the costs for the individual function, and establish the combinations which yield lowest costs under specified conditions.

A guide to uniform cost and financial accounting for poultry processors has been developed and published. This new system of cost accounting can be used by processors to evaluate the efficiency of their own operations and, thereby, to make needed improvements in operating methods. A voluntary system of cost comparison among poultry processing plants all developing cost information under this system of accounting could be especially helpful to the participating plants in pointing to the causes and possible remedies of weaknesses in plant operations.

Studies of marketing margins on poultry and eggs reveal wide differences among 10 major cities. While farm-retail price spreads on Grade A large eggs averaged 24 cents a dozen in 1955-60, the Los Angeles average was 15.4 cents and the New York City average spread was 30.1 cents. Differences in the type and efficiency of distribution systems and practices, distances of major producing areas from the cities, and procurement and merchandising policies of major retailers are major factors underlying these large differences in marketing margins. Farm-retail price spreads on frying chickens averaged 20 cents a pound and the 1955-60 averages ranged from 15.6 cents a pound in St. Louis to 37.8 cents in San Francisco. On medium turkeys, the average 1955-60 margin was 20 cents and the city averages ranged from 15.1 cents in Los Angeles to 27.8 cents in Washington, D. C. Nationally, margins taken by retail stores averaged 40 percent of the total farm-retail price spread for Grade A large eggs, 42 percent for turkeys, and 53 cents for frying chickens.

In New York City, prices and price spreads for Grade A large eggs in cartons average 3.9 cents and 2.3 cents a dozen, respectively, higher in small independent food stores than in independent or chain supermarkets. The small stores also paid more, about 1.6 cents a dozen. Egg prices at all levels in the city move in a close, but by no means, exact relation to Urner-Barry spot quotations for Nearby large white eggs.

### C. Livestock

In the decade 1949 to 1959, marketing margins for red meats increased sharply. Farm-retail price spreads for U.S. choice grade beef widened 57 percent, for pork 41 percent, and for lamb 45 percent. While margins for beef increased slightly again in 1960, margins on pork decreased about 9 percent.

Preliminary findings of an analysis of meatpacking costs in a sample of independent packinghouses indicate rising costs for slaughtering and cutting hogs and marketing fresh pork during a period when packer margins were narrowing. Additional detailed analyses are in progress on cost-efficiency ratios and labor requirements in slaughtering, cutting, boning, and shipping operations for pork and beef at representative plants.

In a comparison of prices of beef, milk, and eggs, and industrial workers' wages in the United States and the 12 countries that comprise the Organization for European Economic Cooperation, the labor time required to earn wages equal to the retail prices of these products was substantially lower in the United States than in all of the other countries with the exception of milk in 3 countries. The labor time required to earn enough to pay for a quart of milk in the United States and Sweden in 1955-56 averaged 7.1 minutes, 7.8 minutes for a laborer in Denmark, and 27.2 minutes for a worker in Italy. For eggs, the range in labor time was 19.5 minutes for a dozen eggs in the United States to 130.6 minutes in Italy. On beef, a United States worker had to work 20 minutes to earn enough to buy a pound of beef compared with 31 minutes in Denmark and 116 minutes in Italy. Thus, consumers in the United States fare much better than those in the OEEC countries when it comes to obtaining much for the money they spend on animal products. In general, farmers receive higher prices in the United States for beef, eggs, and milk than do farmers in most of the OEEC countries. However, retail prices and price spreads on these products generally were higher in actual amounts in the United States than in any of the other countries.

A study of pricing and operational efficiency of wholesale meat distribution in Southern California suggests that price uncertainty and inadequate market information contribute to inefficient pricing and distribution of meat. Price variations within grades frequently exceed price differences among grades. Over half of California meatpackers are integrated with commercial feedlots, and packers sold about two-thirds of their output directly to retailers. Los Angeles wholesalers are specialized by volume and type of customer and specialization among independent packers is increasing. The competitive strength of large retailers relative to packers and wholesalers is increasing.

Important technological advances in methods of curing and handling hides have been made in the last 5 years. But many hide marketing firms hesitate to adopt the new methods and invest in expensive new facilities without adequate information on the costs of curing hides by various methods. In response to this need a technical-economic analysis has been completed on 4 curing methods. Average total costs in 21 plants in 1962 were: \$1.87 per hundredweight (cured shipping weight) in plants packing salted unfleshed hides, \$1.59 in plants curing unfleshed hides by agitated brine methods, \$2.24 in plants curing fleshed hides by agitated brine and \$2.29 in plants curing fleshed hides by the pit cure method. Although pack-salt curing is the lowest cost method for plants curing fewer than 300 hides daily, the agitated brine is much less costly for plants curing 500 and more hides daily. Costs of fleshing hides drop sharply from 16 cents per hide at a daily volume of 400 hides to 12.5 cents at a volume of 1,000 hides a day. The research report on this study will contain many useful details on design of model hide curing plants, facilities and labor requirements, and cost standards for efficiently operated plants.

#### D. Cotton and Cottonseed

Preliminary findings of a study in cooperation with ARS ginning engineers indicate that power costs in many gins are excessive because of too many excessively large fans. Under-utilization of gin stand capacity--the gins surveyed are using only about 70 percent of actual capacity--is another major



factor reducing efficiency and increasing operating costs. Economists and engineers are now developing detailed specifications and cost standards for model gins to serve as guides for increasing ginning efficiency.

Farm-to-retail price spreads on most cotton and wool textile products continue to rise. In 1961, marketing margins averaging 90 percent of the average retail prices of 20 principal wool products were at the highest level since 1938, excepting 1958. And the average marketing margin of 86 percent on 25 principal cotton textile product was at the highest level since 1945. Although margins taken by manufacturers of fabrics have declined somewhat since 1947, margins taken by manufacturers of apparel and household goods have increased. Margins and costs in other sectors of the marketing system have increased also.

Beltwide charges for ginning and wrapping upland cotton averaged \$16.83 a bale in 1961-62, up \$1.41 from 1960-61 and \$1.81 from 1959-60. By States, the increases in 1961-62 averaged 45 cents a bale in Alabama to \$2.42 in Virginia. About 59 percent of the total cotton crop was harvested with mechanical equipment in 1961-62 compared with 51 percent in 1960-61. In California, 91 percent of the crop was harvested mechanically. Warehouse charges for cotton in 1961-62 averaged 80 cents a bale for receiving, 52 cents a month for storage, and \$1.48 and \$1.77 a bale for standard and high density compression, respectively. Compression charges increased about 5 cents a bale from 1960-61, but other charges were about unchanged.

Fire losses are a substantial factor in ginning costs. Annual losses per gin from fires of all types were lowest in the Southeast in 1956-58, at \$213 a year, and highest in the West at \$991. Total loss per bale ginned ranged from 15 cents in the Southeast to 34 cents in the South Central area. On the average, claims collected by gins were only 39 percent of premiums paid. Only simple-equipped gins in the West and elaborately equipped gins in the Southeast collected claims in excess of premiums paid. Although average losses per fire were lower in gins equipped with fire prevention devices, these facilities did not reduce the number of fires.

#### E. Sheep and Wool

The uncertainties arising from wide fluctuations in wool prices can be a substantial cost of marketing wool for all parties involved. Some reduction in effective price uncertainty and hence capital and marketing costs can be obtained, in some cases a reduction of 70 percent, through proper trading (hedging) in futures contracts. Furthermore, such protection through hedging may be improved further at times through the transfer of hedges and through straddle operations.

#### F. Grain

Bread prices and marketing margins continue to rise. By 1961, the average retail price of a 1-pound loaf of bread was 20.9 cents, up 0.6 cent from 1960 and 7.4 cents above the 1947-49 average. The farm share of the retail price of bread in 1961 was down to only 2.9 cents a loaf. Although rising costs of flour milling, transportation, baking and retailing contributed to these increases in prices and margins, the major causal factor has been sharply rising costs of distribution by baker-wholesalers. Research designed to find

more efficient methods of bread distribution is now being conducted. Retail prices of rolled oats and corn flakes also were at record high levels in 1961 and 55 percent above the 1947-49 averages. Rising costs of producing, packaging, and distributing breakfast cereal products are the primary causes of these increases. Although the breakfast cereal manufacturing industry is highly concentrated, this does not appear to be an important factor in the rising prices and marketing margins.

#### G. Feed and Forage

In a study of costs of feed mixing the detailed labor equipment and cost specifications of 2 model mixing cost centers for feed were developed. This study is a part of a broader program of similar analyses covering all 8 cost centers in feed mills. The program is designed to assist feed mill owners and managers to improve operating efficiency. A small, 80-ton (per 8-hour day) mixing center requires an investment of about \$49,000 and can be operated at about 80 cents per ton of feed mixed. Operation on a 2-shift basis reduces this average cost to 70 cents a ton. The larger 200-ton mixing center requires an investment of \$80,000, but can be operated at average costs of 63 cents a ton and 55 cents a ton on 1- and 2-shift basis, respectively. If a feed mill has more volume than the smaller mixing center can handled in 1 daily shift, investment in the larger volume equipment generally will be more profitable.

In a similar study of pelleting operations, model specifications and operating standards were developed and published. At the customary charge of \$2.50 a ton a 75-HP center requires an annual volume of at least 6,700 tons to break even. Additional volume, of course, rapidly increases profits to mill operators.

A study (in cooperation with Iowa State University) of the comparative costs and profits of several types of feeding contracts reveals that only about 40 percent of the financing arrangements studied in Iowa were profitable to manufacturers. The average loss was 87 cents a ton of feed supplied under these contracts. In general, the smaller programs had both smaller total losses and smaller losses per ton of feed fed. Deficiencies in management of the contractual arrangements, rather than the type of contract, were a primary factor in the losses from the programs.

Partial results are available from an incomplete study designed to assist commercial seed processing plants to increase efficiency. The study is cooperative with Oregon State University. Labor requirements for handling seed in plants have been developed. For example, receiving, handling, and storing field-run seed is 4.8 man-hours per 1,000 bags when the bags are transported 60 feet within the plant and stacked manually 6 bags high. The same operation takes 8.4 man-hours when bags are stacked 20 high with the aid of a sack elevator. However, the higher stacking requires only 585 square feet of floor space per 1,000 bags compared with 950 square feet for the lower stacking. These and other related technical-economic information are helpful to plant operators in developing better plant design and operating methods. The study is continuing toward development of complete designs and specifications for seed processing plants.

The detailed specifications and cost standards for a model alfalfa dehydrating plant have been developed. A plant producing an annual volume of 4500 tons of final product requires an investment of about \$106,000. At full capacity it can operate at an estimated cost of \$13.33 a ton, but at 60 percent of capacity the estimated average cost jumps to \$16.45 a ton. However, operating costs are also greatly affected by such factors as assembly operations, adequacy of supplies, and efficiency of management. A report on the study is in press at Kansas State University where the study was done under contract with USDA.

Preliminary findings of a study (being conducted by Purdue University under contract) of grain bank operations in Ohio, Indiana, Illinois, and Iowa, indicate that large numbers of feed mills and poultry and livestock producers in these States are involved. A grain bank is an arrangement between a feed mill and a farmer whereby the farmer deposits grain at the mill at his convenience and receives it later in the form of mixed feeds. About 80 percent of the grain in these banks is corn and about 70 percent of the feed processed from grain bank grain is hog feeds. Detailed analyses of the costs and returns of grain bank operations are now in progress.

#### H. Citrus and Subtropical Fruits

Findings of a study of certain costs in marketing citrus fruits show that the pallet box method of handling oranges from orchards to packing plants is cheaper than the traditional field box method at all seasonal volumes and at all weekly operating rates. For example, at an annual volume of 500,000 field boxes, savings of \$23,400 per year are possible with pallet box handling compared with field boxes.

#### I. Deciduous Fruits

Packing costs are an important part of total marketing costs for fresh peaches. In California, packing costs for Red Haven and Early Elberta peaches averaged 71 cents a lug in ranch sheds and 73 cents in commercial sheds in 1959. Costs among packing sheds ranged from 65 cents to 81 cents a lug. On the average, packing materials were nearly 60 percent of total costs, labor about 25 percent, and overhead about 15 percent. In South Carolina, total packing costs per container were lowest in small sheds and highest in large sheds regardless of type of container because of higher labor and operating costs. For packing peaches in bushel baskets, the predominant container, total costs per basket were \$1.05 for small sheds, \$1.11 for medium size sheds and \$1.29 for large sheds. However, because differences in costs within each of these 3 groups of plants were greater than the between-group differences the latter may not be significant.

Costs of packinghouse operation are a substantial share of marketing charges for apples. Packing costs can be reduced through increased mechanization of packing, increased plant volume, increased length of season, and some changes in methods of paying packers. In smaller plants, with short packing seasons of 200 hours and a season output of 50,000 tray-pack equivalent units, packing labor and machinery costs for each tray-pack carton can be reduced from 21 to 45 cents by using a semiautomatic tray packing machine. In larger plants that operate about 1400 hours a season and have an output of 250,000



tray-pack equivalent units, labor and machinery costs can be reduced from 19 to 12 cents per carton of tray packs. Similarly, labor and machinery costs for a carton of twelve 4-pound bags can be reduced from 26 to 33 cents each, while costs for a carton of nine 5-pound bags might drop from 21 to 19 cents each, if semiautomatic bagging machines are used instead of manual methods.

Research concerned with the effects of technical developments on the optimum economic organization for marketing California fresh pears has centered on the extent to which in-plant costs in fresh pear packinghouses--including precooling and storage costs--are affected by the adoption of recently developed bulk-fill packing techniques together with the use of bulk bins in assembly, and cannery and cull fruit operations. Cost reductions are possible by shifting from lug-box to the much larger bulk-bin containers in orchard-to-plant transportation but the relative costs of the two containers depend on the handling method used and the rate and length of haul. For low rates of output and short lengths of haul, the lug-box method is cheaper. For higher rates of output and longer lengths of haul, the bin handling method yields lower costs than any lug-box method of handling. However, these cost differences are small. In-plant packing and shipping costs for pears are about \$8.75 a ton lower when the volume-filled carton is used instead of the standard wrap-and-place pack box. The fiberboard containers cost about 25 percent less than the wooden boxes. The combination of plant and storage facilities that minimizes combined plant, storage, and "penalty" costs involved in handling a specified total quantity of fruit delivered to a plant in the seasonal pattern characteristic of plants in the Lake County Region (California) has been established. Penalty costs are the additional costs or reduction in revenue incurred by the firm when it is unable to handle a given day's receipts in the normal fashion. Minimum expected costs and cost savings of over 6 percent are achieved by operating a plant up to 10 hours per day and storing excess receipts for handling later. A manuscript on the final phase of this study is now being reviewed for publication.

In the past 5 marketing seasons, total marketing margins on Washington Delicious Apples ranged from \$6.41 to \$7.06 a box in Chicago and from \$6.17 to \$7.41 in New York City. These margins are in the range of 65 percent to 90 percent of retail prices. Wholesale-retail margins averaged over half of total margins and varied inversely with auction prices. Terminal, transportation, and shipping-point charges averaged about 35 percent of retail prices. Chicago retail prices averaged higher than New York retail prices in 4 of the 5 seasons, but the reverse was true for auction prices. Both retail and auction prices move in the same direction, but retail prices fluctuate less. Auction prices vary inversely with changes in supplies. More detailed analyses are in progress, including studies of margins on other principal fruits and vegetables. An effort is being made to separate wholesale-retail margins into their two major components.

#### J. Vegetables

The economic feasibility of establishing new sweetpotato plants in the South has been studied in detail. The study concludes that sweetpotato canning plants must be larger than plants now in operation to achieve high efficiency,

should operate longer each season, and must reduce loss and trim rates sharply. The study recommends these approaches toward greater efficiency in preference to construction of new plants. Manuscripts now in process will present detailed cost data and analyses of investment opportunities in sweetpotato canning operations.

#### K. Sugar

Both retail and farm prices of beet sugar and gross marketing margins have increased sharply since 1950. Prices have increased about at the same rate as the average for all foods. Margins, however, have increased less than foods generally and the farm share of the consumer dollar spent for sugar has remained nearly steady at 36 percent. In recent years, the sugar industry has made substantial progress toward higher efficiency in production, processing, and transportation, thereby reducing the upward pressure on prices and marketing margins. Although previous studies had shown that large losses and gains in weight and polarization of raw sugar were common in shipments from Puerto Rico to the U. S. mainland, a study completed in 1961 indicates that such losses and gains are no longer large enough to be important in the economic sense. The change from shipping sugar in bags to bulk handling can be credited with this important increase in efficiency.

#### L. Oilseeds and Peanuts

Preliminary findings of a study on methods of handling farmers stock peanuts indicate that conversion from bag to bulk handling is taking place rapidly. Nearly all peanuts in the Southeast are now handled in bulk, about 50 percent in the Virginia-North Carolina area, but only about 15 percent in the Southwest. Bulk handling reduces labor costs about a third to a half compared with bag handling. Another significant trend affecting efficiency of shelling operations is the decline from 176 plants in 1949 to 99 in 1961 and the corresponding increase in average volume of peanuts shelled per plant. Research on shellers' margins, outturns and related factors is continuing as a means of providing some of the essential information for policy decisions on price differentials for the several types of peanuts under the peanut price support program. Similar research in 1961-62 clearly indicated the direction and magnitude of needed adjustments in differentials for the 4 principal types of farmers stock peanuts under price support programs. A special industry advisory committee considering the problem of differentials followed the research results closely in formulating its recommendations, adopted by the Department, for price differentials for the 1962-63 crop.

Margarine is a major outlet for cottonseed and soybean oils. About 80 percent of all margarine is sold through food stores mainly in 1-pound units. A study completed in 1961 shows that retail prices ranged from 15 to 39 cents a pound and in 1959 averaged 26.5 cents a pound. The farm share of this price was 6.7 cents. In general, prices of highly advertised brands are well above prices of other brands; independent food stores generally charge more for the same brands than do chains. Also, as a rule, the higher the retail price the higher the marketing margin, particularly the margin taken by retailers.

Peanut butter is the primary product made from peanuts. In 1960, retail prices of a 12-ounce jar of peanut butter averaged 41.8 cents of which the grower received an average of 11.8 cents. The gross farm-retail price spread was divided to shellers 2.1 cents, manufacturers 15.0 cents, and wholesalers and retailers 12.9 cents. Margins taken by chainstores averaged 2 cents a jar below margins in other stores and margins on minor brands averaged 8 cents a jar below spreads on major brands. Research is continuing to relate margins to such factors as containers, brands, retail price levels, geographic areas, and types of stores.

#### M. Tobacco

Preliminary findings of research on tobacco marketing costs show that since World War II the average quantity of tobacco used has dropped from 3.1 pounds per 1000 cigarettes to only 2.6 pounds. The primary causes of this change are the increasing popularity of filter cigarettes and the more complete utilization of the tobacco leaf with the processing of tobacco sheets and use of stems. Nevertheless, the grower and manufacturer shares of retail prices of cigarettes have remained largely unchanged since World War II. Domestic tobacco manufacturers and larger dealers are moving rapidly to green stemming of tobacco and redrying of it in strips. Capacity of a plant is reduced about 25 percent when strips are produced from untied tobacco. This and other technological changes have encouraged development and testing of a new frame for packing untied tobacco which may help to reduce marketing costs materially. This research has excited considerable interest and even enthusiasm among growers and others desirous of finding easier and less costly ways of marketing tobacco.

#### N. General and Multi-Commodity

Research designed to develop standards of performance in food distribution to develop trend measurements of operating efficiency in food distribution is nearing completion. Standards of performance for delivery operations of wholesale food distributors have been developed. The standards are based on time studies and analysis of over 800 delivery trips from the warehouse to the retail store. This procedure makes possible estimates by wholesalers themselves of total delivery time for a given trip, using information that is readily available. This procedure should aid wholesalers to increase delivery route efficiency. Analysis of data collected under contract with Progressive Grocer indicates a substantial increase in operating efficiency of food distribution. At the wholesale level the rate of inventory turnover increased from 14 to over 32 percent between 1954 and 1958 indicating a more effective use of capital and facilities; tons handled per man-hour increased over 73 percent in chain operated grocery warehouses from 1947-49 to 1960. Between 1948 and 1958 increases in retail sales per man-hour ranged from 25 to 55 percent, and sales per square foot of selling space from 9 to 42 percent. A manuscript is now being prepared on this study.

The impact of the New York State minimum wage law on grocery stores was analyzed and reported. No impact of wage gains was observed on average margins, based on 30 items purchased in grocery stores. Although margins increased by 4 percent in "covered stores," margins in smaller communities in "uncovered stores" increased by 9 percent. In larger communities comparable stores not affected by Phase 2 of the Wage Act, had a 6-percent increase.



Few stores reported that they adjusted to the minimum wage gains by making economies in the use of labor. Delivery services were eliminated, some changes were made in stock handling, and some fringe benefits were curtailed. The composition of the labor force has changed since World War II with a decline in production workers and an increase in the number of other workers, including employees who perform administrative, professional, clerical, and sales jobs, as well as those performing scientific and engineering activities. Although scientific workers are a small proportion of total employment in the food processing industry (15,400 scientists and technicians) their wages and salaries are among the highest. (Food and kindred product industries increased their direct R&D expenditures 48 percent between 1954 and 1958.) As research and development continue to be stressed, changes in ratios of labor cost to total cost will change in future years. Labor cost for food marketing corporations have increased both in absolute amount and as a proportion of total costs. Absolute total cost (1945 equals 100) increased from 50 to 250 percent. Retail trade had about a 250-percent increase with canning and processing having about a 50-percent increase. All but two industries had increases in labor costs as a proportion of total costs. The largest increases were 6 percent for dairy, 3.9 percent for retail foods, and 3.6 percent for meat products. Frozen foods and the wholesale food trade had proportionate decreases approximating 1 percent. Aggregate payments for labor per dollar of total costs were highest in bakery products, and next highest in retail trade. They were lowest in manufacture of grain mill products. Fringe benefits now exceed 5 percent of total wage and salary payments (amounts contributed under pension and other employee benefit plans, contributions for welfare, expenditures for social security, unemployment insurance, and other payroll taxes). Adding vacation, rest period, lunch hour, profit sharing and other fringe items may raise this to as much as 20 percent of payroll cost. More detailed analyses of data relating to labor cost will be made and studies of work rules and their impact upon the movement of agricultural commodities will be made for selected areas and selected industries.

A study was designed to evaluate the impact of added processing and changed product form on prices and marketing costs was based on case-study data for four farm products retailed in Washington, D. C., 1959-60. The farm products are potatoes, snap beans, oranges, and lemons. The study shows that costs of processing each of the products were higher than costs of packing for fresh market sales. Part of the added cost of processing, however, was offset by economies at other stages in the marketing process. For example, transportation charges for shipping dehydrated potatoes from Idaho to Washington, D.C., were only 22 cents for a quantity equivalent to 100 pounds of fresh potatoes on which transportation charges were \$1.86 from Idaho, 87 cents from Maine, and 48 cents from New York State. The degree that the added cost of processing was offset varied by commodity. Total costs of marketing per unit were higher for processed potatoes and beans than for fresh potatoes and beans, for which the added cost of processing was not completely offset by savings on transportation, wholesaling, and retailing. However, for oranges and lemons, total marketing costs were lower for the processed products. A manuscript reporting research results is in process of publication.

Out of a continuing study designed to obtain long-range outlook information on the agricultural food marketing bill and to measure output and productivity of resources employed in producing marketing services have come two major technical bulletins and several articles. The bulletins are: (1) Output in Manufacture of Farm Produced Foods in the United States, 1909-58; and (2) Output Per Man-hour in Factories Processing Farm Food Products. These studies reveal, among other things, that output per man-hour in manufacturing farm foods increased at an average rate of 2.9 percent per year from 1947 to 1960 compared with a rate of 2.0 percent for the period 1919 to 1960 as a whole. The postwar rate is about the same as for the total private nonfarm sector of U. S. economy, but only about half as large as in farming. Because of the gains in output per man-hour in food processing plants unit labor costs were up less than a third from 1947-49 to 1960 although average hourly earnings of employees in these plants rose about four-fifths. To relate changes in unit charges to changes in productivity, a time series on prices of intermediate goods and services used in marketing farm foods was developed and published. This research showed that prices of these goods and services purchased by marketing firms rose about 40 percent from 1947-49 to 1961, about the same as the farm-retail spread. Two articles were also published this year on productivity and food processing costs and on input-output (interindustry) analysis as a tool in agricultural marketing research. The data used for the interindustry analysis are from the BLS Interindustry Study for 1947 and are intended as a benchmark for further work in this area. Work on an econometric study of factors determining the demand for factory processing services related to farm food products is continuing. In addition, construction of measures of output and productivity in food wholesaling and retailing is in process; this study on output and productivity in distribution of farm foods will complement the published studies on food processing. The econometric study of factors determining the demand for processing services related to farm foods and work on output and productivity of resources employed in wholesaling and distributing farm foods will continue. Research will begin on an input-output table for 1958, based largely on data from the Census of Manufactures for that year. This input-output table is for agricultural marketing sectors and will be coordinated with the work of the Economic and Statistical Analysis Division on the farm sector and the work of the U. S. Department of Commerce on nonagricultural sectors.

Another study provides for compilation and analysis of farm-retail spreads and other statistics on marketing farm products. Farm-retail spreads for farm foods, cotton clothing and household furnishings, and tobacco products were calculated and published during the year, accompanied by explanatory and analytical material. Consumers paid \$1,060 for the annual market basket of farm foods in 1961, about \$7 more than a year earlier. Marketing agencies received \$656 of this total--and farmers \$404. The increase in the cost to consumers reflected a small rise in marketing charges, as returns to farmers were down slightly. Retail prices of cotton articles averaged a little higher in 1961 than in 1960; returns to farmers and the farm-retail spreads increased slightly. The marketing bill data were revised, incorporating revisions in basic data which were made after publication of census reports for 1958-59. Margins of white pan bread were also revised on the basis of new data available from the 1958 Census of Manufactures. Data on farm-wholesale-retail spreads for beef, pork, and lamb were changed from live weight

and carcass weight basis to a retail pound basis. This change improves the presentation and provides easier interpretation of the data. Work on the estimate of the marketing bill for farm food by the commodity flow method is progressing satisfactorily and the marketing bill will be broken down into assembly, manufacturing, transportation, wholesale trade, and retail trade for selected years 1929-58. Availability of this breakdown is expected to facilitate research in the area of productivity in the food marketing sector. It will also provide better understanding of the allocation of food marketing costs. The commodity flow estimates will be used as benchmarks in estimating the marketing bill for other years. Statistical series maintained under this project will be continued. Review and evaluation of the market basket series will be made in preparation for general revision when the Bureau of Labor Statistics completes its survey of consumer expenditures.

#### PUBLICATIONS REPORTING RESULTS OF USDA AND COOPERATIVE RESEARCH

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## AREA 7

### MARKET STRUCTURE, PRACTICES, AND COMPETITION

Problem. Most agricultural and food and fiber processing industries continue to experience rapid and drastic changes in their market organization and their marketing and merchandising practices. These changes affect both farmers and consumers. Research is needed to keep abreast of such changes and to indicate their probable consequences. Continuing changes and practices alter the basic economic functions for which markets are responsible and involve both technical and economic efficiency. Additional studies are needed to determine differences in impact among commodities as well as upon basic factors such as pricing and costs.

Increasing concentration, changing institutional patterns, and shifts in marketing channels and practices have created a new economic climate in which the farmer must live. As a basis for rational adjustments to this changing environment, information is needed (1) to indicate impacts of vertical and horizontal integration, other changes in market structure or in marketing practices, and the development of new institutional arrangements upon farmers' bargaining position and income and upon the effectiveness and efficiency of the marketing system; and (2) to determine types of Federal-State action most effective and amenable to farmer usage.

The competitive positions of many commodities, producing areas and farms, and marketing firms are changing under the impacts of shifts in the location and technology of production, changes in demand and location of population, changes in transportation, processing, and marketing methods, development of new products, and changes in agricultural programs. Analyses of marketing aspects of interregional and interproduct competition in agriculture are required to guide public policy and the decisions of farmers, marketing firms, and others in making essential production and marketing adjustments.

### USDA PROGRAM

The Department has a continuing long-term program of economic research to assist farmers and marketing agencies to adapt to changes in market structure, practices and competition. Work in the area is conducted at Washington, D. C., at the Western Research Office, and at Lincoln, Nebraska; Stillwater, Oklahoma; Madison, Wisconsin; Lafayette, Indiana; Urbana, Illinois; Tucson, Arizona; Brookings, South Dakota; Corvallis, Oregon; Raleigh, North Carolina; Denver, Colorado; St. Paul, Minnesota; University Park, Pennsylvania; Columbus, Ohio; Gainesville, Florida; College Station, Texas; Kansas City, Missouri; Bozeman, Montana; Moscow, Idaho; Experiment, Georgia; East Lansing, Michigan; Davis, California; and Guelph, Ontario; where in most instances it is cooperative with the respective experiment stations. The Federal scientific effort devoted to research in this area totals 47.6 professional man-years. Of this number, 10 are devoted to market structure and costs, 3 to marketing orders, regulations, and services, 5 to dairy, 2.3 to fibers, 12.0 to fruits and vegetables, 1.9 to grains and feeds, 4.8 to poultry and eggs, and 2.9 to other crops and products.

#### A. Market Structure and Costs

The research shows substantial structural changes which continue to occur in food and fiber industries. Changes are examined at the retail, whole-sale, assembly and processing levels of the marketing system; and the work relates to both horizontal and vertical integration. The research examines the factors which inhibit entry and exit in food marketing and processing industries, and studies of particular industries are designed to determine the consequences of changes in structure for farmers and consumers.

Continuing studies are made of labor inputs in selected food processing industries; in addition, impact of legislation such as minimum wage laws will continue to be examined, as well as the consequences of changing work rules upon cost for transporting agricultural commodities.

As new technology like freeze-dry is introduced, studies will be made to determine the implications of its widespread adoption for growers and for agricultural processing and marketing firms.

Work is in process to determine the types and magnitude of taxes involved in marketing food products and a study of the relationship of these taxes to the market structure. When extent and kinds of taxes have been identified, a study of their effects upon market structure will be undertaken, with particular emphasis on growth and size of firms in food marketing.

Continuing studies are under way to determine the magnitude of advertising expenditures by marketing firms and to assess the impact of changes in firm size and diversity as related to advertising outlays. Information showing total costs, advertising costs, and gross sales, is being collected and analyzed for all firms engaged in manufacturing, wholesaling, and retailing food and kindred products. The relationship of advertising to growth of food companies particularly will be stressed.

Work is proceeding to determine the frequency and magnitude of changes in retail prices of specified commodities during designated time periods and to ascertain the relationship of these changes to (1) the kind of retail food organization, (2) the pressure for and use of specific price leaders, and (3) the extent to which these pricing practices reflect basic market forces.

Current research is designed to include the measurement and interpretation of profits and profit ratios with firms marketing agricultural commodities. Work will also contrast the amounts and ratios of profits earned by firms within and among agricultural marketing industries with nonagricultural industries of the same kind of organization and size. Efforts will be made to appraise the functional measurement of farm retail marketing margins and, where applicable, use will be made of profit data to evaluate the efficiency and allocation of resources, the distribution of income, and the relationship of profits to market structure, and the nature and rate of growth of agricultural industries.

#### B. Marketing Orders, Regulations, and Services

The existing marketing order system is being studied at Washington, D. C., in order to obtain quantitative measures of effects upon returns to growers



of selected commodities and to provide a basis for assessing operational differences among commodities. In addition, Federal regulatory policies and service activities dealing with agricultural marketing and processing problems are being analyzed. Examples include basic legislation authorizing market orders and agreements, the Commodity Exchange Authority, the Perishable Commodities Act, marketing information services, and Federal grades and standards. Evaluations will be made of the effect of particular kinds of governmental policies or activities. Pressures and needs which brought about certain forms of governmental participation will be identified. Identification will be followed by an assessment of the influences of particular governmental activities on changes in selected agricultural market structures and on the conduct and performance of agricultural marketing and processing industries. Consideration will be given to the influences on economic development of government activities outside agriculture as well as to particular developments within agriculture.

#### C. Procurement Practices of Marketing Firms

Work is under way in Washington to identify existing types of procurement systems and to differentiate among these systems in respect to their objectives and practices. This work is preliminary to a quantitative evaluation of the effectiveness of the various types of procurement systems or practices and to a determination of factors which lead to the development of specific types of procurement systems.

Research is being conducted at Washington on the procurement practices of cotton mills and cotton merchants to determine the extent of recognition of quality variables other than grade and staple in pricing and merchandising methods and to evaluate the effectiveness of various procurement procedures in obtaining economically desirable qualities.

Procurement practices of national chain stores in obtaining fruits and vegetables from processors are being studied at Madison, Wisconsin. Some 33 processing companies have been interviewed and data collected which will describe the practices and some of the consequences of these practices.

Data are being collected in Washington from chains, voluntary, and co-operative retailers to determine buying and selling practices and pricing methods for shell eggs and to determine means of equating the needs, requirements, and objectives of various participants.

#### D. Dairy

Dairy marketing research emphasizes change--changes in the structure of markets and in marketing practices and the impact of these changes on marketing firms, producers, and consumers. The impacts of the growth of "drive-in dairies" on handlers of other types and on producers and consumers are being studied. Research into the nature and causes of retail milk price wars in city markets indicate impacts of such wars upon consumer prices, producer incomes, and the margins and comparative relationships among handlers. The flexibility of dairy manufacturing plants is shifting among products and has resulted from and contributed to many changes, including (1) a shift from farm-separated cream to whole-sale milk sales by farmers, (2) the improved quality of raw milk supply,

(3) changes in the relative importance of different dairy products, (4) improved transportation facilities which have extended supply areas and the market for finished products, and (5) larger and fewer plants with more progressive management. Pooling in fluid milk markets is being analyzed in relation to change in supply and demand conditions to determine the effect of various ways of pooling on producers and plants, the structure of the market, and the relation of price to supply, and to analyze ways in which pooling might adjust to changing market conditions.

#### E. Fibers

Research is being done to determine the effect of changes in market organization and in practices followed in merchandising and manufacturing cotton and cotton products upon the effectiveness and efficiency of the various segments of the marketing system.

#### F. Fruits and Vegetables

Work is underway in Washington and in the Western Research Office to determine the regional supply, demand, and price relationships for processed fruits and vegetables and to determine the competitive position in the national market of the major commercial fruit and vegetable processing areas. The possible effects of new production and processing methods on the comparative advantage of one area over another will be analyzed. The study should supply data upon which to base projections of an efficient pattern of adjustment and growth for the fruit and vegetable processing industry. Work in Florida and Texas is designed to compare the practices of different producing areas in marketing grapefruit. Statistical models will be developed to measure the effect of a number of variables upon the prices of individual types of grapefruit. Relative prices of grapefruit from different producing areas will be considered as well as the substitutability of grapefruit from one area for that from another. Work in Michigan is concerned with deciduous fruits in the North Central and Northeastern States.

Present research is concerned with the market structure for fresh and processed fruits and vegetables. The principal project in this area is a study of the structure of wholesale markets for fresh produce. This study includes 58 markets throughout the United States and will describe changes in numbers and size of firms, changes in merchandising practices, and changes in marketing channels.

Other studies relate to the impacts of repackaging and shipping technologies on the structure of fresh deciduous fruit markets in California and procurement practices for potatoes grown in Idaho. In addition, the study gives attention to processing as a market outlet and the impact of processing on returns to producers and resulting changes in the market structure on the Idaho potato industry. The Raleigh, North Carolina, and Griffin, Georgia, offices are evaluating processing as a market outlet for selected vegetables grown in the South. Initial attention has been given sweet potatoes and to a study to describe the vegetable processing industry in the Southeast.

## G. Grains and Feeds

Recent extension of operations of many marketing firms toward both sources of supply and product distribution is materially altering the structure of the grain market. Part of the current program of research is designed to study the magnitude and future course of these changes. This research is devoted to evaluating (1) the marketing channels for grain and changes in grain marketing institutions, (2) integration problems associated with grain bank operations and contractual arrangements between farmers and feed manufacturers, (3) the market structure feed retail distribution, and (4) the impact of alternative grain trading units on the structure of grain markets. Contract research includes a project which is studying farmer feed manufacturers contract arrangements and one which is studying grain bank operations.

## H. Livestock

Market structure and practices research in the livestock industry is oriented toward the changing structure and marketing and pricing practices of wholesale meat distribution systems including meat packers, processors, wholesalers, and purveyors, and chain or independent retailers. It also includes an appraisal of the changes in market structure and pricing practices associated with the emergence of the commercial feedlot, as well as a study of the price formation relationships between country and terminal markets for hogs.

At Raleigh, North Carolina, Ames, Iowa, and Denver, Colorado, cooperative research with the southern, north-central, and western regions is underway to project the locational changes of livestock and meat marketing institutions which are to be expected with the growth and locational shifts of population projected during the next 15 or 20 years.

## I. Poultry and Eggs

The study of interregional competition is a central feature of regional research projects in the northeastern, southern, and north-central regions. We have contributing projects through its employees at Durham, New Hampshire, (working in cooperation with the New Hampshire and Massachusetts Agricultural Experiment Stations) and Knoxville, Tennessee, (working in cooperation with the Tennessee Agricultural Experiment Station). Work at the new field office at St. Paul, Minnesota, which will be carried out in cooperation with the Minnesota Agricultural Experiment Station, will contribute to the north-central regional project in the area of interregional competition.

Studies of the structure of the commercial hatchery industry of the combinations of the egg-type and broiler-type chicks and turkey poults under one management and of the relationships between the breeding and hatching industry and other production and marketing firms are being conducted in Washington and in cooperation with various field stations. Work on the extent and nature of vertical integration in the turkey industry is being initiated by Washington personnel following a pilot study supported by Economic Research Service in the field. Marketing channels and practices for ducks are being studied nationally and in New York State in cooperation



with the New York State Department of Agriculture. The organization and development of the Georgia egg industry is being studied in cooperation with the Georgia Agricultural Experiment Station.

#### J. Other Farm Products

An analysis was undertaken to appraise long-time trends of economic variables in fats and oils industry and their effects on structure and practices. A current survey describes and appraises the location, structure, and marketing channels of the hide and leather industry.

A survey this year will report the procurement marketing and operating practices of peanut shellers.

Work on interregional competition in sugar includes a study of the effects of shifts in population, changes in marketing practices and consumption patterns, and new developments in technology on the competitive situation of producers and processors of sugar in various areas of the United States, both mainland and offshore.

A study compares the practice of marketing tobacco tied and untied.

### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

#### A. Marketing Orders

Supply response to administrative changes in milk prices is being studied at the Kansas station in order that milk gluts and scarcities can be avoided and to assure an orderly flow of milk at prices that are fair to producers and consumers. The Nebraska station is doing basic research bearing on how the flow of hogs to market might be improved from the standpoint of orderly marketing and improved prices.

#### B. Grower-Dealer-Processor Contracts

The supply response in milk production under different types of pools is being studied by the Pennsylvania station. This study will shed light on the advantages and disadvantages of individual handler pools versus market-wide pools.

A number of States have projects which deal in part with vertical integration problems, including the problem of bargaining power under these arrangements.

#### C. Alternative Market Outlets

Research to discover new farm markets and ways to improve existing ones is going on for a number of commodities at different locations. Alaska, for example, is studying the possibilities of developing a veal market for the calves from local dairy herds as an alternative to the present destruction of calves at birth.

Several States are studying the diversion of surplus farm products to secondary uses in conjunction with studies of Government program alternatives.

#### D. Procurement Practices of Marketing Firms

Seven Western States are participating in Regional Project WM-40, Procurement Policies and Practices of Large-Scale Food Retailers. This project touches upon many of the questions of the price-making forces and the farmers' bargaining position with respect to the giant food corporations. Three States are studying the quality requirements of present food buyers and their methods of quality measurement. The implications of food procurement policies to the marketing position of farmers, especially small farmers, are being made explicit by this research.

#### E. Government Programs

The State Experiment Stations are engaged in extensive studies of farm programs and alternatives under two regional projects--SM-14, Alternative Programs for Adjusting Prices, Supplies, and Marketings of Agricultural Products in the South, and W-59, The Impact of Governmental Price, Income, and Related Policies on Western Agriculture--and one interregional project--IRM-1, Price Policies. These studies will show what the impacts of these programs have been on producers, consumers, marketing firms, and the Government. At present considerable attention is being given to analyzing the consequences of alternative farm programs currently proposed. While most research attention in the past has been on the marketing aspects, some of the current research deals with soil bank programs and the relationship of labor resources on farms to income opportunities in agriculture. A subcommittee of the interregional study (IRM-1) and individual members of the technical committee, at the request of Congress, have assisted the Department of Agriculture in analyzing the impact of alternative national price and income policies on which the Congress wished special information. Both the Department and individual members of IRM-1 have made extensive use of data and relationships developed under the various contributing projects in complying with special congressional requests for the evaluation of alternative policies.

Excellent research on Government programs is going on outside the regional projects. The Illinois station, for example, is studying State laws affecting their agriculture; and Nebraska is investigating the impact of State and Federal laws and regulations on selected commodities.

In conjunction with the studies on farm programs, basic information on supply and demand has been developed as this information is essential to the exercise of bargaining power in such a way as to enhance income. These studies also seek to develop alternative methods for enhancing farm prices and incomes whether by exercise of group bargaining power or by the exercise of governmental powers.

#### F. Dairy Products

The experiment stations in all regions are engaged in research on market structure and practices as they affect the marketing of local dairy products. In regional project NCM-26, Changing Market Structure and Organization of the Midwest Dairy Industry, the North Central States are evaluating changes in the market structure and organization in relationship to changes in the commercial use of milk, production areas and

practices and processing plant efficiency. Effects on the income to producers, and on the public interest is also appraised. The Northeastern States are studying the effect of bulk assembling of milk, new methods of packaging, pasteurization methods and regulations, and various technological developments on the market structure for milk. In addition, the effect of changing economic conditions, farm technology, and quotas on the volume and pattern of milk production is being investigated. The relationship of these factors to surplus milk and to the dairy manufacturing industry will be made explicit. Southern States are coordinating their research on institutional forces affecting the Grade A milk industry, the supply of milk for manufacturing, fluid milk movement to market areas, and plant organization and location under SM-10, Establishing Guides for Efficient Organization of the Dairy Industry under Changing Conditions in the South. Western States are studying adjustments in type and capacity of plants in manufacturing, the impact of changes upon amount of milk available, changes in the nature and type of competition, and other aspects of market structure under WM-46, Effects of Changes in Marketing Methods and Systems on Milk Marketing in the Western Region.

The Alaska and Wisconsin stations are studying the competitive position of their dairy industries relative to other regions. In the former State, emphasis is on ability to compete with shipped-in and recombined products, while the latter is evaluating possibilities for widening market outlets in other regions.

#### G. Fibers

Nine State experiment stations have contributing projects to a Beltwide regional study SM-24, Alternative Cotton Marketing Practices and Systems for Increasing Efficiency in Channels of Trade. This involves detailed analyses, by segments of the cotton area, of potentials of alternative cotton marketing systems with major emphasis on ginning and merchandising. Arizona and New Mexico have joined efforts through regional project WM-41, Influence of Recent Technological Developments on the Marketing and Market Acceptance of Western Cotton, to determine what adjustments in production, marketing and processing may be advantageous to the region.

#### H. Fruits and Vegetables

Many of the experiment stations devote considerable research resources to investigating the market structure and practices for the various fruits and vegetables in many producing areas. A description of current practices provides a basis for knowing where inefficiencies are and what obstacles exist to improvement of marketing practices. Another phase of this research deals with the effects which changing technology and practices have upon the availability of markets and returns to the grower. An example of these projects is the study of how large-scale retail buyers operate, what they will expect of farmers in terms of commodity specifications, and marketing services, and how farmers may be compensated for performance of services, previously the responsibility of other sectors of our production-marketing system. Another element of these studies is the determination of processing and packaging plant location in relation to economy of size of producing area.



The northeast region is coordinating research in this area under NEM-23, Sales Organization for Marketing Northeast Processed Fruits and Vegetables.

Several States have projects designed to determine the potential market for their products and their cost and price relationships compared with those from other States. California and Georgia are also giving attention to factors affecting optimum locations for processing plants. Oregon is developing information on the costs of items used by the fruit and vegetable processing industry in the Northwest as compared with other regions in the Nation. Three States are completing a project, WM-17, Competitive Position of the Western Region in Marketing Frozen Fruits and Vegetables.

Maine is studying the effect of changes in transportation methods and practices upon the market area for northeastern potatoes as a part of the cooperative regional effort, NEM-20, Effects of Changing Marketing Practices on Product Quality, Consumer Acceptance, and Returns in Marketing Potatoes. Idaho is studying the degree of competition between fresh and processed potatoes and the present and potential demand for processed potato products as a basis for developing guidance to the Idaho potato industry.

New Hampshire is developing information on prices and distribution costs for apples for 12 regions in the United States. This information, together with production and demand, is expected to show the competitive advantage or disadvantage of each area. Georgia is analyzing the market demand and seasonal pattern of shipment of Georgia peaches in order to determine the most profitable markets.

Florida is doing research on the effect of the development of pink tomato shipments upon the State tomato industry, and also the competitive relationships between California and Florida celery. As a part of a regional project, SM-8, Evaluation of Alternative Vegetable Marketing Organizations and Handling Methods, Georgia, Louisiana, North Carolina, and Mississippi are studying the competitive position of important vegetable crops grown in their States, based largely on cost of processing, cost of transportation, and prices received. New York and Oregon also have projects in this area. New York and New Mexico are developing information on prices received for local products as compared with that of distant products shipped into the States.

#### I. Grains and Feeds

States in the Midwest are coordinating research in this area under regional study NCM-30, Impacts of Changing Conditions on Grain Marketing Institutions and the Structure of Grain Markets. This study includes an analysis of the direction and magnitude of the major changes in farm organization, the principal economic forces, policies, and practices influencing changes in grain marketing institutions, and the relation between economic forces and policies, and the trends in market structure. A study of changes in the marketing structure and the competitive practices of the wheat milling industry is also under way (Nebraska). An analysis of the local marketing practices and utilization of corn is being conducted by Alabama, and the present market and channels of movement for grain sorghum is being studied in Oklahoma. The problem of seed marketing is

being attacked by South Dakota, Nebraska, and Nevada. The Pacific Northwest market for winter and spring wheat and trends in movement from a mountain State (Montana) is being studied. The market outlet and potential demand for two-row malting barley is also being analyzed.

A study of the structure of the hay and feed markets and factors influencing practices and prices is being conducted by six States in the western region WM-20, The Economics of Marketing Hay and Feed in the West. Distances are great and the market organization and marketing methods are not well understood. The role of the processors, factors affecting adequacy and acceptability of grades, and means of communicating market information are being scientifically analyzed and appraised as a basis for suggestions to improve efficiency of marketing. An economic analysis of the impact of technological change and increased market information on the hay marketing structure is also being studied (Montana). A Southern State (Georgia) is also studying the hay market, including the feasibility of pelleting hay. The impact of marketing developments on the operation and organization of the feed industry is being conducted by a North Central State (Indiana).

Illinois is studying the market system for soybeans and soybean products, including the manner in which prices are determined, the competitive position of soybean oil among edible and technical vegetable oils, and factors affecting users' acceptance.

Iowa is analyzing the methods, practices, and costs of storing and marketing feed grains and soybeans and the processed products of the crops to learn the relative economies of various methods and evaluate effectiveness of present marketing methods, facilities, and overall structure in view of current and anticipated trends.

Illinois is studying the impact of marketing developments on the operation and organization of the feed industry, while Kansas is evaluating grain and feed bank operations to determine the practices of those firms where the grain bank operation is a success.

Ohio is making an evaluation of the effect of highway development on the location of elevators and their volume of business. North Carolina is developing information on seasonal and market price variations for major markets and for local markets within the State. Oklahoma is studying the relative costs of truck and rail shipments of grain to major terminals and the effect of sales to truckers upon returns to the elevator.

#### J. Livestock and Livestock Products

The State experiment stations, representing all regions, are conducting research on market structure and practices and their effect on the marketing of livestock and livestock products. Much of the effort takes the form of well integrated and coordinated regional research. In the Midwest, ten States are participating in a regional project NCM-25, Adjustments in Livestock Marketing in the North Central States to Changing Patterns of Production. This research will indicate needed adjustments in production to prospective demand and will determine the effect of production, consumption and transportation costs upon the market structure of the industry. Five Midwestern States are completing regional project NCM-18, An Analysis of the

Changing Pattern of Livestock Markets in the Corn Belt Region. The findings will provide information on marketing channels used by farmers and on practices followed and services performed by marketing firms. Various north-central stations are conducting research individually on the spatial and functional aspects of procurement, processing and merchandising facilities for livestock and meats, with special attention to problems of location, structural changes, and economic factors influencing future marketing and processing. States in the Northeast are conducting regional research under NEM-7, Factors Affecting the Efficiency of Livestock Marketing, to determine the impact of specification production and buying upon livestock market organization and services. States in the South are cooperating in SM-23, An Analysis of Livestock and Meat Movement in the Southern Region, to determine the volume, direction and seasonal variations in movements and to determine their effect upon efficiencies of the livestock industry. Independently other Southern State research has to do with the effect of vertical integration upon livestock production and marketing; the impact of new and potential developments on market practices and the quality and supply of meats; and the effect of present organizational structure upon the marketing system. In the West, States are cooperating and participating on a coordinated basis in regional project WM-39, An Economic Analysis of Alternative Marketing Methods of Cattle and Sheep in the West. The analysis will show the nature and extent of direct marketing and costs and returns from different methods of marketing. Other research has to do with the impact of specification meat buying by large retailers on producer returns.

#### REPORT OF PROGRESS FOR USDA AND COOPERATIVE PROGRAMS

##### A. Market Structure and Costs

Research on consolidation, integration, and merger among agricultural marketing firms and their economic consequences was carried on to maintain a continuing record of structural change in food and kindred product industries and to determine growth patterns as reflected in value added, capital expenditures, etc. and rate changes in growth, associated with alterations in structure and associated marketing practices.

The work located in Madison, Wisconsin, and St. Paul, Minnesota, focused upon theory and empirical relationships of vertical integration. In Washington research concentrated upon developing estimates of capital used by food industries and identification of economic integration during the period of 1954 to 1958.

Findings show that as a firm extends its operations vertically it also must meet horizontal scale adjustments. An integrated unit may have to operate at a higher level of output than one which is more specialized, provided it wishes to obtain all potential horizontal economies of scale. But also the integrated unit may encounter difficulties at lower horizontal levels of output than a specialized structure, especially when resources are limited. For some situations these forces cause diminishing returns, preventing a firm from vertically integrating to the fullest extent.



Statistical findings support the contention that large firms whose horizontal expansion is limited by the "extent of the market" often can gain a cost advantage and an increase in size by vertically integrating. These cost reductions arise because the integrated firm is able to operate more of its activities at the minimum cost than the one that is segregated. Furthermore, the cost of performance in the market can also be reduced by integration. These costs arise mainly from two sources--those encountered in the process of price discovery and the cost of correcting errors in product specification that result from faulty "interactivity communications." These costs are highly specific and can be reduced by partial integration.

A draft manuscript on the estimated value of durable capital used by food retailers has been completed and reviewed. For the first time, this manuscript provides figures on the amount of owned and leased durable capital classified by corporations, partnerships and proprietorships. Well over one-half of all durable capital in retail food marketing is leased. This fact is important in the development of studies of productivity, capital communication, financing, etc.

Nebraska University report has been reviewed and cleared for publication. A technical book by the Nebraska University press is expected during the present fiscal year.

Analysis of Company Statistics suggests that at the three-digit level little integration has occurred. In fact, four major industries, meat packing, dairy products, canned and frozen foods, and bakery products suggest a decrease in horizontal integration and a probable increase in both conglomerate and vertical. In the case of industrial specialization percentages, the meat packing industry appears to indicate a decrease in vertical and conglomerate. In the case of the other industries as we have suggested there is an increase in both vertical and conglomerate. Most important is the growth in importance of multi-unit companies. In each instance there is an increase in the percentage attributable to multi-unit firms. Employment per unit value added supports the growth in importance of the multi-establishment company. Growth by multi-establishment companies appears to be more by acquisition than by internal methods, including expansion of present capacity in existing establishments. In contrast, in dairy and baking such internal growth appears to have outweighed that accomplished by acquisition. Such data show total acquisition tendencies which do not enable additional differentiation between horizontal and either or both vertical and conglomerate integration.

Advances were made in measuring changes in food inventories at wholesale level. Over a 30-year period there has been a great reduction in the amount of stocks carried per dollar of sales, and the nature and approximate reasons for such changes are in the process of quantification. A major manuscript reports new research approaches to the study of capital and finance and their relation to changes in marketing structure. It shows how capital and financial arrangements can accommodate changes in specialization of production, enlargement of scale and application of technology.

Estimates of the proportion of total sales in retail grocery stores which are composed of nonfood items and the cash value of nonfood sales were made under a cooperative study with Purdue University.

Research studying the influence of renting resources on profits of food retail and processing firms was reported. It was discovered that many retail food chains follow the practice of leasing most of their long-term capital needs. This sharpened the contrast with food processors who own the bulk of land and buildings. Lease-financing has become a means whereby retailers control large amounts of capital without disturbing conventional debt ratios in their financial report. However, the character of these lease contracts is such that long-term obligations similar to debt are incurred. The result of leasing causes retailers to become highly leveraged firms carrying a higher degree of risks than food processors. This high degree of risks is reflected in higher profit ratios computed on stockholders' equity. This conclusion was established by computing the total returns to capital both equity owner and creditor for group of food retailing and processing firms. Total returns were found to be substantially the same in the two groups. Higher equity returns to retailers is explicable in terms of leverage and cost of creditor capital including rent. Returns to total capital above cost of creditor capital accrued equity as a return to risk bearing resulting in higher stockholder returns that are consistent with total resources in the industry receiving "normal profits."

Depreciation charges made by food and kindred product firms were almost as large as the profits (after taxes) during 1959. In postwar years depreciation has been steadily climbing while profits have declined. The major pressure behind the rise in depreciation was the decline in average lives over which assets have been depreciated. Also, the switch to using rapid methods of depreciation added substantially to this rise. Reliance upon such rapid methods can lead to "higher declared profits" than actually are earned. A firm continuing to invest the same or more assets in depreciable assets over time will experience an ever increasing or "perpetually deferred tax account." Such developments have implications both for Government operations and for the economic status of companies for stockholders.

Estimating procedures incorporating adjustments to the marketing bill have been developed. Research findings indicate that during the 1947-49 period direct taxes paid by U. S. food processors, wholesalers, and retailers have reached a billion dollars. By 1958 these taxes amounted to \$1.8 billion and by 1960 they were \$2 billion. The total taxes for 1960 represented 5 percent of the "marketing bill." Of these direct taxes, 47 percent were nonfederal. These included property taxes, social security, unemployment insurance, State income, franchise, and license fees. The remainder is the Federal income taxes.

The relation of taxes per dollar of sales is one which varies directly with size of firms. However, its relationship is dominated by the Federal income tax as taxes other than income taxes are not closely related to size.

## B. Marketing Orders, Regulations, and Services

A preliminary review has been made of the Florida citrus industry to ascertain future implications of the rapid and substantial changes now being experienced by this industry. Particular attention will be given to the structure, including marketing orders and similar arrangements now extant. It is too early to determine whether a publishable manuscript will result from this study.

Simultaneously, study is being initiated to ascertain relationships between variations in grain firm organization and integration and the use of grain futures markets and to determine effects of changes of market structure in the grain industry on the relative importance of groups of large evaders in grain futures markets. This work is being initiated this fall.

A study analyzed the economics of the raisin industry giving particular attention to the impacts of market orders on the industry. Findings were reported in the 1960 annual report. A manuscript analyzing the marketing orders for raisins is being reviewed for publication as a technical bulletin.

Also see poultry and egg section ahead, page 92.

## C. Dairy

Managers of marketing firms can improve the accuracy of their decisions by giving some thought to the manner in which they reach decisions. This conclusion was reached in studying the way information is used in decision making in the shift from cream to whole milk and the choices between can bulk methods of handling milk in South Dakota dairy plants.

The analysis demonstrated that decision making was performed primarily by managers of the firms. They were influenced by a wide variety of sources of information. The process of arriving at a decision was viewed differently by the managers and outside observers who had been in contact with them before and after the shifts in procurement. It was not possible after the decision to reconstruct the steps by which the managers shifted from being satisfied with their former method of operation to being convinced that the new method (assembly of whole milk and choice of bulk handling) should be adopted.

A study aimed at an understanding of the causes and consequences of the price wars which occur sporadically in city milk markets shows these price wars may cause insolvencies among milk dealers and losses to the farmers who supply them. They also pose problems of policy for State and Federal agencies concerned with milk marketing and the enforcement of fair trade practices. In more than 20 cases of milk price wars studied, it has been possible to distinguish between the commonly observed "destructive" aspects of price wars, such as breakdowns of orderly marketing and the extreme pressures on small firms and other aspects which play a part in changing conditions of milk marketing. Thus, price cutting which has touched off price wars in some city milk markets has appeared to be incidental to improvements in transportation and refrigeration.



Analysis of the drive-in dairy store industry in central California identified the factors and conditions which permit introduction and successful operation of this new type of store. Study indicates that the basic impetus to their development arises from a supply of fluid milk of market grade significantly in excess of the market requirement for such milk plus a guaranteed sales price which limits competition to nonprice considerations. Also, (1) the development of new housing subdivisions, (2) the breakdown of older marketing methods and loyalties and acceptance of new ones as well as (3) a growing consumer awareness of sales prices encouraged introduction of drive-in stores.

In spite of accepted economies of scale in processing by larger plants, small drive-in processors are able to compete by eliminating costly services of delivery. Also, in many cases the operator of a drive-in is willing to accept a residual between his sales returns and operating expenses as adequate return for his labor, capital, risk and other factors regardless of their return in alternative employment.

The movement of bulk milk from outside sources into fluid milk markets is growing and prices of milk are more closely related among markets as a result. Comparison of price maps of dealers' buying prices for fluid milk demonstrated a closer alignment of prices between distant markets and major supply areas during 1960-61 than in either 1953-54 or 1957-58. Buying prices in eastern markets were generally lower in 1960-61 than in 1957-58.

The setting of prices for Class III milk under the New York-New Jersey Federal and State milk marketing orders must consider the effect of prices on the utilization of milk in that class. Manufacturers in the market varied their output in response to changes in net margins, but that net margins accounted for a relatively small part of the total variation in output. Chief among the factors, other than margins, were difficulties in finding outlets for products which processors might want to produce in larger quantities. Other factors included the geographic scope of processors' sales activities, commitments to producers for supplies of milk and to buyers of the products, multiplicity of health approvals, and pool plant status.

Prices had been generally favorable to manufacturers using Class III milk from the New York-New Jersey pool and had been below competitive levels. An increase in prices would also carry increased risk that not all the Class III milk would be sold. The alternatives are limiting supplies, providing for competitive determination of Class III prices, or of establishing further use classifications.

Technological innovations in the milk market industry and local and regional shifts in the demand for and production of milk are instigating changes in the structure of the industry. Shifts in the source of supply and in the utilization of milk in the Pacific States, and specifically in the Portland-Vancouver market, have been analyzed and the results show the dynamics of milk market structure such as changes in shares of the market held by individual distributors, and the complex interactions among producers, producer organizations, and milk marketing firms.

Efficient handling of surpluses in fluid milk markets can contribute to market stability and to increased returns to milk producers. Detailed information as to the character of these surpluses and the types of arrangements used in marketing them in 14 major markets have been analyzed, and budgetary analysis completed of alternative arrangements for disposing of surplus fluid milk in each of three markets. Linear programming analysis was employed to show the practicability of using a large, diversified dairy manufacturing plant as the outlet for the surplus fluid milk from several local markets.

Study of surplus milk problems and handling arrangements brings out that fluid milk dealers use surplus milk they process largely in cottage cheese and ice cream. Milk in excess of that used by bottlers in fluid items and in these products is largely manufactured either by plants that regularly receive milk of manufacturing quality or by standby plants. Increasingly the disposal of this more burdensome type of surplus is being taken over by fluid milk cooperatives. The assumption of greater responsibility by cooperatives and the advent of bulk handling of milk on the farm are facilitating the diversion of this excess directly from farms to manufacturing facilities. This comparatively efficient disposal arrangement is now the dominant one in most large city markets that have the bulk of this excess milk.

Analysis of the mechanics of supply-demand adjusters examines the characteristics of adjuster mechanisms and relates them to the behavior of the adjuster. While it brings out that there is no ideal mechanism, it points up the many problems associated with short-time fluctuations and changes in the seasonal pattern of production inherent in the use of the two-month movers that are most commonly employed.

The methods of pricing and marketing surplus milk; i.e., milk used for other than fluid purposes, have substantial effects on returns to producers and processors.

A study of market structures and practices for cottage cheese and frozen dairy products in relation to pricing surplus milk in fluid milk markets in Kansas, Missouri, and Oklahoma showed how to improve pricing practices for surplus milk. Fluid milk plants in these States use about 10 percent of their surplus butterfat and frozen dairy products. These products account for about 18 percent of total dollar sales. More than 80 percent of all cottage cheese and frozen dairy products are sold to stores, hospitals, etc. Sales in outside markets are important to many plants, particularly to larger plants. The findings indicated that if plants are unable to absorb higher ingredient costs, they might find it difficult to offset higher costs by raising selling prices. Also, many plants may switch to using other lower cost ingredients which are readily available.

Efficient handling of surpluses in fluid milk markets can contribute to market stability and to increased returns to milk producers. After completion of a survey of surplus milk handling problems and arrangements in more than 100 midwestern markets, detailed information was obtained as to the character of these surpluses and types of arrangements used in handling them in 14 major markets. A study of the mechanics of supply-demand adjusters, as devices used to help regulate milk supplies in fluid markets, was completed with publication of a regional report.

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Plans were advanced for a study of changes in the organization and structure of the dairy industry, their consequences to the industry and to the general public, and alternative public, industry and firm policies needed in consequence of them.

After extensive planning, arrangements have been completed for special tabulations to be obtained from the Bureau of the Census. These will provide information on market shares of groups of leading companies in each major dairy industry, and on the size of plants operated by each of the various types of organizations in each of those industries. Additional data are being obtained as a byproduct of a United States Department of Agriculture study of flexibility in dairy plant operations. These data will show production, by major products, in plants of differing degrees of specialization; share of output by largest plants, frequency distributions of manufacturing operations by size, by major product groups; relation of size to degree of diversification; etc. Still other information is being obtained from (1) analyses of trends in shares of packaged milk sales in the various Federal order markets made by the group of four largest handlers; (2) determination of the shares of output of each major dairy product in 1954 and 1958 by groups of the largest plants as determined from Census of Manufactures data on employment; (3) reports of the Federal Trade Commission and similar agencies; and (4) State data on numbers, size, ownership, etc. of dairy plants. An outline has been developed for a proposed regional manuscript, tentatively entitled "Changing Organization of the Dairy Marketing Industry of the North Central States."

#### D. Fibers

1. Cotton. Research on problems and economic consideration in modifying the bale wrapping for cotton was concerned with (1) the nature and extent of the deficiencies in the package and surface condition of U. S. cotton bales in overseas markets; and (2) practical means of eliminating or reducing these shortcomings. A supplement to MRR-326, issued in June 1960,



was released. It provides detailed data on the deficiencies in cotton bale packaging which the cotton industry can use to improve the bale package and thereby strengthen American cotton's competitive position.

We have evaluated the problems, possibilities, and economic feasibility of using cotton fabrics to replace jute materials in packaging U. S. cotton. Through the early months of 1962 physical and economic evaluations were made of several experimental all-cotton bagging fabrics developed mainly by the Plains Cotton Growers, Inc. While the physical performance of each of the experimental materials was generally favorable, it was recommended that significant changes be made in the specifications for this bagging. Despite the highly unfavorable initial costs of the 1961-62 all-cotton bagging, some of the industry leaders contended that this could be overcome if a subsidy program were provided for a limited time.

A broad objective is to help bring about a pricing system which more accurately and effectively reflects the true use value of U. S. cotton, taking into account such fiber properties as length, strength, fineness, and maturity. We found a large majority of shippers favored early efforts to develop separate price quotations for fiber fineness and expressed a willingness to cooperate in such an effort. Practically all shippers interviewed provided useful information on their 1961-62 practices in testing and pricing for properties other than grade and staple length.

2. Wool. Results of an extensive study of the nature and extent of wool warehouse operations suggest means of improvement. Warehouses vary markedly in size, volume, and operating methods. Many lack (1) adequate volume for efficient handling, (2) suitable insurance at reasonable rates, (3) information on the most suitable facilities and equipment, and (4) adequate classification and market information for effective merchandising. Although capacity and volume were not significantly related, there was a significant relationship between volume and the proportion of gross warehouse income derived from wool. Nearly 50 percent of the 215 million pounds of wool sold at warehouses was merchandised without the aid of grading or other product improvement, and only 33 percent was tested for yield. State and Federal agencies have results to evaluate wool marketing systems and improve market news reports.

#### E. Fruits and Vegetables

The wholesale fruit and vegetable business is a static industry in the midst of a dynamic economy. The total volume of fresh fruits and vegetables for off-farm civilian consumption increased 12 percent from 1935-39 to 1957-61, while the total volume of all food was increased nearly 60 percent. Direct buying from shipping points by chains and other retail organizations has increased sharply, and the total volume of business of wholesalers has declined. The number of major wholesalers is declining. These changes in structure create severe strains within the industry both at the wholesale and the shipping point level. Their impacts on farmers, in terms of the demands for their products (quality, uniformity, packaging, quantity, etc.) are marked. Wholesalers, packers and shippers, and farmers will find it increasingly necessary to make adjustments to the different types of buyers with whom they must deal and their requirements.

Recent technological developments have had tremendous impacts on the organization and practices of the California fresh deciduous fruit industry. A survey of the fresh deciduous fruit packers was completed in August 1961. As expected, differences were found among the types of firms and those handling the various fruits. Cooperatives in California handle about 16 percent of the total volume of fresh deciduous fruits, but they handle about 64 percent of the pears. Grower-shippers handle about 65 percent of the total volume, but they handle almost 80 percent of the table grapes and over 80 percent of the apples.

Procurement arrangements between packers and growers are highly informal, unless production credit is involved, but relatively little such credit is extended by packing firms. Cooperatives all use some type of marketing contract, but these seldom are rigidly enforced.

Approximately 52 percent of California fresh deciduous fruit is sold through some type of sales agency; the balance is sold by individual packing firms. About 15 percent of the packing firms use bulk (size) pallet bins in some part of their operation. Only 8 percent of the firms pack deciduous fruit in consumer-size packages.

Analysis of the survey data indicate that the acreage of the various major types of deciduous fruits in California is likely to expand as much as 25 to 43 percent by 1975. The State's share of total United States production has increased about 10 percent since the 1920's, and this trend is expected to continue. The location of production within the State is shifting, largely due to the sharp increase in the acreage of these fruits in the San Joaquin Valley as compared to other areas. There is evidence of an increase in the size of farms, especially in the Central Valley. The major utilization trends observed are the increasing emphasis on processed forms of these fruits and the dramatic decline in their per capita consumption, especially in the fresh form, during the past few decades. The fresh marketing sector seems to face two major types of problems in its adjustment to these changing conditions. These involve increasing marketing efficiency and maintaining or improving competitive position. Two types of relatively new handling techniques--bulk filling of containers and bulk-bin handling--should aid in increasing efficiency through lower container costs per pound of fruit and decreased packing expense.

Prepackaging by California firms at shipping-point has not been generally satisfactory. However, the cost of repacking into consumer-size units at market centers seems to be excessive, especially in view of the cost of initial shipping-point packing using traditional methods. Hence, the combination of bulk-packing at shipping point with prepackaging at the market may be feasible.

Analysis of the impacts of these new techniques are a part of the studies that are continuing on this project. Field work has been completed for a study of the costs of packing peaches in different types of containers. This study will concentrate on a comparative cost analysis of new sizing and filling equipment, styles of containers, and methods of filling in relation to plant size and length of season.

Western growers and processors are attempting to determine their present competitive position in the production and processing of frozen fruits and vegetables and to project an efficient pattern of development for the future growth of this industry. Costs of production and processing have been determined for nine major fruits and vegetables in the Pacific Coast States. Analyses of costs of processing a six-product mix comprising broccoli, Brussels sprouts, lima beans, peas, snap beans, and spinach indicate that substantial cost savings can be achieved by processing selected combinations of these vegetables in multi-product plants rather than in plants organized on a more specialized basis.

An analysis of the total unit costs of processing snap beans, lima beans, spinach, and broccoli for six geographic regions has been completed. The results of the regional processing costs show that cost differences among major producing regions tend to be relatively minor. With snap beans, for example, there is less than \$1.00 per 100 pounds difference in costs of processing among the northeast, northwest, and California regions. Cost estimates developed in earlier phases of this study for producing, processing, transporting, and distributing four major vegetables (frozen snap beans, lima beans, spinach, and broccoli) as related to six producing areas and ten major consuming areas are being incorporated into analytical models of interregional competition.

A similar analysis regarding the competitive position of the frozen green pea industry indicates that the northwest frozen pea industry currently is in a relatively strong competitive position and that this is likely to continue into the future. Assuming no significant changes in the regional structure of relative cost and supply relationships, the analysis shows that increased consumption corresponding to increased population and incomes will be satisfied by an expansion of production in all producing areas with the largest increase occurring in the two States in the Northwest. This will be especially true with a continuation of the present trend in the westward shift of population.

A study of market structure and performance of the lower Rio Grande Valley fruit and vegetable market was initiated in August 1961. Detailed information on prices paid and prices received during the 1960-61 season were obtained from a stratified random sample of 32 shippers in the Valley.

Tomato price data have been analyzed and a report prepared for publication. Major findings relating to tomato prices and market structure were: (1) entry of firms into the market was easy, (2) blend f.o.b. tomato prices and grower prices moved closely together over most of the 1961 season, (3) in 1961, market news tomato prices were highly accurate and reliable indicators of the range of prices paid to growers but were less accurate indicators of the range of f.o.b. prices, (4) there appeared to be no significant difference between prices paid by national chainstores and other types of buyers.

Work is underway to determine the economic feasibility of processing vegetables grown in the Southeastern States. Vegetable processing is a relatively small industry in the region. Little is known concerning



the economic conditions under which vegetable processing plants might reasonably expect to prosper in the South.

A survey of 58 canning plants located in seven Southeastern States was completed in June 1961. Data were obtained from each firm concerning (1) the kinds, amounts, value, and procurement area of raw products; (2) the amount, value, and distribution of products processed; and (3) the problems of immediate concern to processors.

About 476 million pounds of vegetables valued at more than \$16 million were processed in southeastern plants in 1960. Green beans, tomatoes, pimientos, potatoes, and turnip greens were the leading vegetables packed and accounted for 59 percent of the total volume. Sixty-eight percent of the total volume was processed by canning plants and 32 percent by freezing plants. Thirty-six percent of the vegetables was obtained through written contracts with farmers and 64 percent through noncontract purchases.

Canners packed approximately 11 million 24-303 case equivalents of fresh vegetables with a value at the plant of \$32 million. Ninety-six million pounds of finished vegetable products were frozen with a value of \$15 million.

Most of the 1960 southeastern vegetable pack was sold through brokers and commission agents. The largest part of both canned and frozen vegetables was sold in the Southeast. The northeast, east north central, and south central regions were important markets with only a small part of the pack shipped to the more distant western regions.

Canning firms indicated that securing raw product was their most severe problem in 1960 with marketing finished product, financing, and labor next in order of importance. Vegetable freezing firms indicated that financing was the outstanding problem with marketing finished product, securing raw product, and labor next in order of importance.

The practice of shipping staked or trellis-grown tomatoes showing a color break has been a major development in the marketing of the winter tomato crop in recent years. A market survey involving interviews with 46 tomato handlers in 27 major market areas of the eastern United States to provide information regarding the effect of this innovation upon the pricing and market structure of the tomato industry was completed in 1961. Analysis of the data shows: (a) the practice of shipping vine-ripened tomatoes has resulted in significant changes in the business operations of terminal market handlers; for example, many repackers have either discontinued handling mature green tomatoes altogether or they have discontinued them during the peak shipping periods for vine-ripened fruit; (b) the method of sale for the winter tomato crop has been altered in that a substantial proportion of the vine-ripened crop is sold by consigned sales, (c) about one-half of the firms reported the necessity for reprocessing vine-ripened tomatoes after receiving them from the shipping point because of variations in color and maturity condition within individual packs and shipments, and (d) only one-half the firms regarded the current system for grading vine-ripened tomatoes as adequate for efficient trading.

Research is designed to obtain new types of market information to study price relationships, to determine costs of producing and processing and to project the most efficient future patterns of production and distribution for the tart cherry industry. Progress has been made in each of these areas except projection of production and distribution patterns. This will follow completion of other aspects of the study.

This study indicates that the long-run tart cherry equilibrium price is much higher than the average price received in recent years. Preliminary results of a study of the costs of producing tart cherries in the three major Michigan producing areas indicate a range in these costs of 5.45 to 6.19 cents per pound. Close cooperation has been maintained with the New York Agricultural Experiment Station in a concurrent study to insure comparability of results. In-plant studies of tart cherry processing have been made to develop labor and equipment production standards which will be used to estimate processing costs.

1. Citrus. Two approaches were used in the study of competitive practices in marketing Florida and Texas grapefruit. One was to determine if price differentials existed between comparable types of grapefruit at the wholesale level. After much price data were collected and tabulated in preparation for analysis it was found that the lack of information for comparable types of grapefruit and for certain time periods precluded fitting the data to a reliable statistical model. This approach was then abandoned.

The second approach was a survey of terminal market handlers of grapefruit to determine buying and handling practices and, also, to determine to what extent buyers believe that quality of grapefruit is related to the State in which it is produced. A survey was conducted and personal interviews obtained from 165 handlers in eight terminal markets where Texas and Florida grapefruit compete.

During April and May 1962, experimental tests were conducted in nine supermarkets in Grand Rapids, Michigan, to determine the demand and substitution relationships for citrus both in the fresh and processed form. The objective of these tests was to generate data with which demand and substitution relationships for Florida and California Valencia oranges could be established. Preliminary analysis of a portion of the data indicates that the statistical design provided data that, when transposed into the economic model, yielded coefficients associated with the Price Elasticity of Demand and Cross Elasticity of Demand which meet the requirements for economic consistency.

2. Potatoes. Rapid development of potato processing in recent years has greatly affected the whole structure of potato marketing. Frozen french-fried potatoes are now the most important frozen vegetable product in volume. In the Northwest, the number of potato processing plants has increased from seven in the early 1950's to twenty-two in 1961 in response to a strong demand for processed potato products, improvements in product quality, and substantial innovation profits to processors. But the outlook for the industry is no longer so favorable. In the Northwest, plant capacity is excessive except for frozen french fries, and new plants are coming into operation in other major producing areas. As a result, competition for

outlets is increasing rapidly among plants and among areas. Thus, the relative costs of producing and marketing various processed potato products will greatly affect the location of production and other adjustments in the potato industry.

Costs of processing field-run potatoes were found to vary between \$0.87 per hundredweight for granule to \$1.24 per hundredweight for frozen french fried. This did not include the cost of raw product, packaging or selling and distribution. Packaging costs varied from 3½ cents per pound for granules in institutional pack to 9 cents per pound for retail packaging flakes.

Particular attention has been given to studying competition in marketing Idaho potatoes in competition with Maine and North Dakota in Chicago, New York, Atlanta, Dallas, Denver and Los Angeles. The price of Idaho potatoes was consistently higher in all markets.

#### F. Grains and Feeds

Grain marketing channels changed in many ways during the 20 years, 1939-59, in the marketing of wheat, corn, oats, barley, sorghum grain, and rye. Decentralization of marketing operations was a major trend during this period. Although off-farm sales of feed grains increased from 40 million tons in 1939 to 96 million tons in 1959, receipts at 14 major terminal markets remained almost unchanged. Thus, these receipts as a percentage of off-farm sales fell from 82 percent to 43 percent. In addition to the trend toward bypassing terminal markets more and more grain is moving from farms to subterminal elevators located at interior points. In 1959, fewer and larger country elevators handled a much larger annual volume of grain than in 1939 and many of the interior elevators assumed many of the functions of terminal elevators. Export markets have become increasingly important in recent years as an outlet for U. S. grain and changes in transportation facilities and methods, including the St. Lawrence Seaway, have influenced grain movements and trade channels. More than three times as much grain was processed and manufactured into prepared animal feeds in 1959 as in 1939. Farmers in 1959 sold 38 percent of the feed grains they produced and repurchased 51 percent of their off-farm sales in the form of mixed feeds.

Findings indicate that commercial storage more than doubled from 1955 to 1960 due to increased production, increase in CCC carry-over stocks, and movement of out-State stocks to storage along export routes. Construction material shifted from concrete to steel. Type of construction from up-right to flat due to smaller initial investment costs and ease of maintaining market value. Sorghum receipts are principally by truck, but shipments are by rail. Aeration has increased rapidly and fumigation is universal.

On-farm storage also increased. About one-half of production is sold at harvest, principally to elevators. Sales to truckers are unimportant. More than one-third is stored in commercial elevators and less than one-fifth on farm, usually in flat structures. Eighty percent of elevator stored sorghums and thirty-eight percent of farm stored sorghums were under CCC loans. Most farm storage problems come from high moisture and insects. Quality maintenance practices vary widely in methods and effectiveness.



Study investigates the feasibility of providing a hedge in future contracts for high protein premiums for spring wheat. Such a hedge is not now possible, but many buyers and sellers of wheat wish that it were.

Although technically it might be feasible to provide a hedge against fluctuations in the high protein premiums, this would not be practical. If a future contract would provide protection against the fluctuation in high protein premiums for spring wheat, speculators, who usually carry a substantial volume would be discouraged from participating in future markets. The already thin future markets in spring wheat would become even thinner.

Study conducted on marketing alfalfa and feed grain in the West shows that less than five percent of alfalfa enters commercial channels. The marketing system is immature in all Western States except Arizona. Little relationship exists between the price received and the quality of hay sold due to the undeveloped system of marketing and lack of valid quality criteria for use in pricing.

#### G. Livestock

A number of econometric models have been constructed and tested in an attempt to describe the livestock-meat economy and to project current rates of economic change.

Trends in meat distribution by area from 1929 to 1958 show that changed relative importance of packer branch houses, wholesalers, and direct packer sales to retailers reflects closely the development of retail chains and the shift in population centers. Changes in patterns of consumption, distribution, processing, and production of livestock and meat are being analyzed by regions for the U. S. The forces leading to these changes are being isolated and measured.

Substantial changes in the structure of the southern plains meat industry may be required in the next several years. Marked changes are occurring in population, incomes, retail grocery structure (growth of supermarkets and voluntary and cooperative retail groups), and in the technology of marketing, processing, and merchandising.

In the West, information on interstate and intrastate cattle movements has been assembled from brand and health inspection records. Movement patterns for feeder and fat cattle are being identified and shifts in the patterns are being analyzed. Attention is being given to the development of a framework for determining the factors important in feedlot and slaughter plant locations.

The geographic distribution by substate areas within the southern region of livestock marketings, slaughter and meat consumption has been analyzed to show market outlets and sources of supply.

Hog and pork movements and hog price differentials in six southeast coastal States have been analyzed to show that the least-cost optimal solutions, as a percent of actual hog movement costs, for one-week periods in November 1959 and February, May, and August 1960 were 78, 65, 64, and 67 percent, respectively.

Changes in method of sale in the West may affect (1) the structure of cattle prices, (2) costs and returns to feeders who sell to packers at the feedlot versus other methods of selling, and (3) the relation of the growth of large-scale commercial feedlots in the West to methods of sale and market structure for fat cattle.

Country market prices were higher for Good grade slaughter cattle than terminal market prices for the period of 1957-60. Terminal market prices for Choice grade slaughter cattle were higher than those at the country markets for the same period.

The consumers of the Southwest may prefer beef with less fat than the consumers in the Midwest and West. The country markets in the Southwest are stronger markets for Good grade slaughter cattle and the terminal markets in the Midwest and West are stronger Choice grade markets.

An econometric technique, consisting of a series of spatial-price equilibrium models with alternative assumptions on transportation costs and capital restrictions was used to evaluate the effect of changes in transportation costs on the location of slaughter. The model was tested with secondary data then used to generate evidence about adjustments that will be required to meet changes in the livestock and meat industries.

Changes from present transportation-rate structure based on value of product to one based on cost to the carrier of service furnished would decrease transport rates for meat relative to livestock. This would contribute to shifting of slaughter toward areas of surplus livestock supply and away from deficit areas and lead to shorter distances shipped for livestock and longer distances for meats.

Price relationships and price changes at terminal and interior country markets may disclose whether price leadership patterns exist among terminal and interior markets and provide a basis for more effective selection of market outlets by producers.

An analysis of day-to-day changes in hog prices indicates that changes are larger but less frequent at interior markets than at terminal markets. Market prices are more closely related within a market area in Iowa and Minnesota than between selected western and eastern Cornbelt terminal market areas. Correlation analyses of day-to-day changes in prices of hogs at the Chicago terminal market to other terminal and interior markets indicate that there was a somewhat higher relationship between individual terminal markets and the Chicago terminal market than existed between individual interior markets and Chicago.

Numbers, sizes, and other characteristics of Southern California meat packers and wholesalers may be such as to explain some problems in supplying and pricing beef for that area. Southern California packers and wholesale meat distributors were asked about their supply sources, production, sales and inventories by price and grade, and retail food chains were asked about specifications, purchases, and price paid for meat by grade.

More than half of California packers were integrated with commercial feedlots. Packers sold two-thirds of the meat direct to retailers. Los Angeles wholesalers were specialized by volume and type customers. Packers' branch houses had decreased; number and specialization of independent packers and beef breakers increased. Changes in structure and meat wholesaling were influenced by development of chainstores and commercial feedlots. Competitive strength of large retailers has increased relative to packers and wholesalers because of their volume, specification buying, capital resources and alternative supply sources. Uneven purchases by retailers and uneven flow of feed cattle and carcass beef through marketing channels affected prices. Price uncertainty and inadequate market information contributed to inefficient pricing and price variation within grade often exceeded that between grades.

#### H. Poultry and Eggs

Research designed to evaluate the possible economic bases for marketing orders and agreements and to determine if these would be preferable to other marketing arrangements provided valuable background for administrative use in connection with proposed legislation and proposed programs under the Agricultural Marketing Agreements Act of 1937, as amended. Analysis of the National Turkey Federation proposal pointed out some of the defects, particularly from the standpoint of the public interest. A review of literature and theory provided the basis for several papers discussing the possible use of marketing orders and other techniques to improve farmer's bargaining power on turkeys, broilers and eggs. Preliminary estimates were made of short-run effects on farm and consumer prices if marketing orders were used.

Study of the present egg pricing system and alternatives to it indicates that during periods of low egg prices, the base price quotation system is heavily criticized by producers and others in the egg trade even though it is not the primary cause of low prices. Thus, interest in egg pricing research rises and falls cyclically, although the problem is basic and needs study in depth over time. Most actual prices are determined by discounts below and premiums above base prices, particularly the New York quotation. If the present system were to be retained, some expansion in Exchange trading and further changes in the condition of trading would be desirable. If the volume of trading is too thin, quotations may not be representative of the bulk of the eggs moving through trade channels. Despite this drawback, many of the alternatives to the present pricing system that have been proposed, completely beg the question of how to discover new prices or new values for the product. The most likely alternative seems to be the establishment of pricing committees.

Research on the egg procurement programs of large-volume retailers and their suppliers shows that virtually all of the large-volume retailers view themselves as quality leaders offering eggs to consumers at competitive prices. However, the suppliers had a different image of some of the retailers.

Predominate systems of egg procurement used by large-volume retailers are: (a) candling and cartoning of loose eggs by retail warehouses in



or near metropolitan areas; (b) receiving cartoned eggs at retail warehouse in truckload lots; (c) retailer-owned subsidiary candling and cartoning facilities at country point or in metropolitan distribution area; (d) country assemblers or wholesale receivers supplying eggs to individual stores; (e) single farms supplying individual stores.

Prices paid for eggs by large-volume retailers are determined mainly by applying premiums to various base price quotations issued in metropolitan areas such as New York City, Boston, and Chicago. The New York City base price quotations were used extensively in many cities along the eastern seaboard and extending into the midwestern States. Within individual metropolitan areas a fairly high degree of consistency was found in the premium structure over the base, and for markets using the same base, the difference in premium structure reflected mainly transportation differentials. However, the use of different base price quotations in the various metropolitan areas resulted in varying returns to producers.

## I. Other

1. Fats and Oils. Significant changes in the fats and oils industry during the past 20 years were analyzed. During this period domestic production of fats and oils more than doubled, changing the position of the United States from a net importer to a net exporter. The phenomenal increase in production in the main is the outgrowth of the sharp increase in domestic production of soybeans.

Major changes in domestic food uses are increased consumption of margarine and decreased use of butter; increased use of shortening and decreased use of lard. However, the use of lard in the manufacturing of shortening has increased.

In the nonfood group the major changes are a sharp decline in the use of fats and oils in the production of soap resulting from an increased use of synthetic detergents and a decreased use of drying oils.

2. Hides. Meat packers cure 61 percent of the total hide supply and sell the remaining 39 percent on a green weight basis to hide dealers. However, about 85 percent of all hides are marketed through hide dealers or brokers and the remaining 15 percent are sold by packers to tanners. Analysis of secondary data indicates that labor is the largest single cost item in marketing leather products. Labor accounts for half of the total curing costs, 60 percent of tanning costs, 61 percent of shoe manufacturing costs, and 25 percent of retail selling costs.

3. Pecans. The objectives of studying market structure and practices of the pecan industry are: (1) to evaluate the present system of marketing pecans; (2) to determine marketing costs; and (3) to suggest means of increasing marketing efficiency. In the spring of 1961, all of the 80 shellers and processors were interviewed throughout the Pecan Belt, and in St. Louis and Chicago. Eight of the firms handle almost 50 percent, and 37, or slightly less than half of the firms handle 90 percent of the total sales of shelled and in-shell pecans to commercial outlets. Bakeries and bakery suppliers are the largest outlet for shelled pecans, using approximately 38 percent of the total. Confectioners purchase 20

percent, while almost 20 percent are sold through wholesale and retail grocers. Nearly all of the in-shell pecans are sold through grocery outlets.

4. Sugar. Analysis of existing practices and recent trends in the marketing of refined sugar in relation to market organization and efficiency shows that shifts in consumption from household to industrial users and increased deliveries of liquid sugar and dry sugar in bulk have been important market influences in recent years. Also, the increased proportion of the total supply of sugar marketed by beet sugar processors since 1955 has been a factor causing shifts in the boundaries of market areas and in price relationships among areas. Prices in the United States, under the influence of the Sugar Act of 1948, have been much more stable than in the world market. This has reduced the price risk incurred by buyers and sellers.

Since World War II there has been a slow decline in the relative importance of sugar and an increase in the proportion of corn sirup in the sweetening materials used by most food industries. The use of non-caloric sweeteners by bottlers of soft drinks is increasing rapidly, and these products appear to be the most important competitors of sugar in this industry. The lower costs of corn sirup and noncaloric sweeteners are an important factor encouraging the use of relatively less sugar and more competing sweeteners by industrial users.

A study of the marketing problems of sugar beet growers and processors in the "eastern" area (Michigan and northern Ohio) is being coordinated with a study of the economics of growing beets in the area, which is being conducted by the Michigan Agricultural Experiment Station.

A survey of the problems of growers in marketing sugar beets has been completed and results are being analyzed. A survey of the practices and problems of industrial food processors in the "eastern" area in purchasing and using sugar produced in the area, as compared with sugar from other areas and other sweeteners is in progress and will be completed shortly.

5. Tobacco. Study of the comparative advantage to growers of marketing their tobacco tied and untied continued. Data for 1960 confirmed the saving in labor from preparing tobacco untied. The average man-hours saved by preparing tobacco untied was 1.92 hours per 100 pounds in 1960 and 1.87 hours in 1959. Even at current farm wages the money saving is substantial.

The grower preparing his tobacco tied eliminates sand, trash, leaves, and other waste not eliminated when preparing tobacco untied. This waste must be eliminated in subsequent processing. Therefore, tobacco buyers discount untied tobacco. The average discount the growers in South Carolina took for untied tobacco was much larger in 1960 than in 1959, \$8.55 per hundred pounds compared with \$2.21. Thus, the net effect of selling tobacco untied rather than selling tied tobacco, when calculated on the original weight of the tobacco before preparing for market, was a loss of \$1.18 per hundred pounds in 1960 but a gain of \$4.14 in 1959. However, these averages conceal marked differences between tied and untied prices by grades, by areas, and by individual farmers. In other words, no clear advantage of one method of selling over another could be established, but individual farmers may find one method generally preferable to the other.

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## AREA 8

### INFORMATION, OUTLOOK, AND RURAL DEVELOPMENT

Problem. Current marketing information and outlook is critically important to the efficiency of markets. Such information is used widely and intensively by farmers, marketing firms, and public agencies as aids in making many important decisions greatly affecting farm outputs, markets, marketing operations, prices, returns to growers, and expenditures of consumers. This information is also used in many ways and for many important purposes by public agencies, research organizations, extension workers, trade groups and others. Marketing information gathered and published by the Department facilitates the communication process among buyers and sellers, a process that is absolutely essential for modern markets. It usually is the primary factual foundation of economic analyses of marketing conditions and outlook statements and forecasts.

In recent years, the difficulties of providing useful marketing information have increased enormously. As production and marketing conditions and practices change, as shifts in the location of producing areas, markets and marketing operations occur, as the nature of products, marketing firms, processing, and transportation methods are altered, and as the structure and performance of markets change, the need for changes in the nature, location, and volumes of market information becomes great. Traditional reports may become obsolete, new or greatly revised reports may be required, and changes in sources and methods of data collection may become necessary. The problem of adjustment of information services to changing market needs requires continuous study. Such a continuing program of research designed to assist the Department in improving the usefulness of its output of marketing information should include studies (1) to evaluate the uses made by both private and public users of information; (2) to determine the nature of the primary needs of these users for information; (3) to develop improved means of collecting data, making estimates, and reporting essential information; and (4) to evaluate impacts that information services have on decision making by farmers, marketing firms, and public and semi-public agencies.

Future growth in population and demand, changes in product mix and sources of supply, changes in input-output relationships in marketing and introduction of new technology and products will cause major changes in the character and quantity of resources needed in marketing and the way in which the marketing functions are performed. Research is needed to indicate the probable situation in the intermediate future (about 5 years) and long term (10-20 years) to enable marketing firms, farmers, and Government agencies to plan their operations intelligently so that the adjustment to new conditions can be made in such a manner as to promote economy in the marketing of agricultural products, provide consumers with products they desire and aid farmers in finding markets.

Rural communities depend upon marketing and processing facilities to prepare and sell products they grow and provide expanding employment opportunities. Research is needed to: Determine the minimum size of establishments which

will be economically feasible for operation within particular communities and for markets of specified size; make economic analyses of new uses for existing products, and new products from raw materials grown in under-developed rural areas; improve the efficiency in assembling, processing, wholesaling, and retailing operations of existing establishments.

Means are needed to achieve a more adequate utilization of labor and other resources either by providing new off-farm employment opportunities for rural residents or by facilitating resource adjustment through improving market outlets for products produced in low-income farm areas.

## USDA PROGRAM

The Department has a continuing program of economic research relating to marketing information, outlook, and marketing aspects of rural development. The work is conducted at Washington, D. C.; Berkeley, California; Bozeman, Montana; Columbia, Missouri; and Kansas City, Missouri. The program involves 9.3 professional man-years of which 7.3 are devoted to information and outlook and 2 to rural development.

### A. Fibers

Current research is designed to determine for cotton the basis for and accuracy of central market price quotations for grade and staple length and to suggest means of improving methods of establishing quotations and increasing their accuracy and usefulness, including recognition of additional quality factors.

Research on wool is being done to determine the relationships of wool prices to such factors as yield, fineness, and staple length; to establish the essential elements of a feasible classification service; and to evaluate the potential benefits and problems of classification and market information services to producers and others.

### B. Livestock

The need and adequacy of an experimental wholesale carlot meat market report is under analysis. The report is offered to a group of interior meatpacking points west of Chicago accounting for about 40 percent of the federally inspected meat in the United States.

### C. Poultry and Eggs

Research is in progress in cooperation with the Dairy and Poultry Market News Service to develop and test weekly reports on the movement of shell eggs into retail channels in 18 major metropolitan areas that together consume more than half of the eggs produced in the United States. Successful reports are now operating in 9 cities and work is underway in 9 others. The individual city reports are designed so that they can be combined into a national report giving a good indication of current movements of eggs out of marketing channels into the hand of final users. Plans are being made to develop and test similar reports for broilers and turkeys.

D. Other - Cross-Commodity

Current program includes an analysis of the effects of marketing information on supply and price adjustments among competing markets. The study estimates the degree which maladjustment in supply or prices may be caused by inadequate market news data or other kinds of market information.

Another major phase is the design and the evaluation of the experimental marketing programs on cross-commodity and area bases. The present experimental program seeks to test the feasibility of reporting prices, supply, movement, cost conditions and other data for sample areas in Missouri. Assigned area reporters cover several commodities under the guidance of a State coordinator. The research appraises the operation of the experimental program and evaluates use of the information by producers and marketing agencies.

E. Western Region

The study aims to characterize and quantify the present physical and economic structure for marketing agricultural commodities in 11 Western States and to appraise the direction and magnitude of probable changes in marketing in the West, taking into account expected changes in demand, probable adjustments in production, and changes likely to occur in the technological and economic environment that relate to marketing. The research is correlated with the long-term outlook studies of demand and production in the western region.

Research has been initiated under contract with the Bonneville Power Administration to project quantities of commodities processed by agricultural marketing industries in the Pacific Northwest by 5-year intervals to 1980. The work is closely correlated with projections of farm output and will also consider probable changes in demand and in the technology and organization of marketing.

F. United States

A comprehensive study of inputs and outputs in agricultural marketing has been initiated to provide the basis for long-term projections of resources needed in marketing in the aggregate and by marketing function.

In cooperation with three State experiment station regional committees adjustments required in the livestock marketing and meat distribution system associated with the increasing population the changing geographical distribution of population and expected increases in per capita income are being studied in Washington, D. C.

G. Market Opportunities and Efficiency in Assembly, Shipment, Processing, Wholesaling and Retailing of Farm Products

Studies of economic feasibility of particular food processing plants for low-income areas were completed for Alabama, Florida and Montana. This work was done in cooperation with the respective experiment stations. Research methodology for a more generalized analysis of areas in the South and Midwest is being developed.



Numerous appraisals of specific loan applications were made upon the request of FHA and REA.

A contract with the University of Montana provided for a study of all farm employment opportunities which would result from an expansion of food processing in the western part of Montana.

#### RELATED PROGRAMS OF STATE EXPERIMENT STATIONS AND INDUSTRY

##### A. Livestock and Livestock Products

The adequacy of marketing information on livestock and livestock products is of continual concern to the experiment stations. Kentucky is making an economic analysis of livestock marketing information available in the State to determine what information is available on live animals and dressed meats to farmers and the meat-packing industry, and what additional information is needed to improve the accuracy of pricing these products. The Montana station is also conducting research for the purpose of appraising livestock marketing information available and to formulate needs of livestock producers in the State which when fulfilled will be most useful in decision making relative to production and marketing problems.

##### B. Other Farm Products

North Dakota, Missouri, South Carolina, and Utah are investigating the adequacy, accuracy, and utilization of market information provided to farmers and others for a wide range of farm commodities. These studies will also indicate how the market information can be presented so as to be more intelligible and useful to farmers. The end objective of these projects is to provide farmers and others with market information in such a way as to enable them to more nearly balance total production with demand for each farm commodity and to improve timing of sale so as to increase farm income.

The USDA is the principal agency engaged in the collection and publication of marketing statistics and related information for farm products. Only a few private statistical reporting services and trade groups publish limited, and usually highly specialized, types and quantities of marketing information. Even these private groups rely heavily on USDA statistics and estimates in their published reports. The research done by these private firms and groups to evaluate and improve their services probably is extremely limited and results are not published. Furthermore, most research in this problem area is best conducted by USDA research personnel because of the need, in most studies, to work closely with those USDA personnel directly responsible for specific marketing information reports and services.

Research agencies of States and their subdivisions devote much attention to economic growth and future needs for resources to meet expanded population and demand. There is, however, no known research underway specifically directed to the study of the long-term outlook for agricultural marketing, functions and resources on a regional or national basis.

C. Market Structure, Practices, and Efficiency in Assembly, Shipment, Processing, Wholesaling, and Retailing of Farm Products

The Nebraska station is studying the supply of labor in the small town and cities of the State relative to the labor needs of food processing plants. This study is designed to find ways of doing more processing of farm products in local rural areas and thus provide more local employment, especially for displaced farmers. The study may also develop a basis for new farming enterprises such as canning crops thus enlarging the farm income base of the rural areas.

D. Market Area Analysis

The Oklahoma and South Carolina stations are making surveys of the marketing facilities and practices in their State, particularly in the low income areas, to determine what marketing improvements would contribute to the prosperity and progress of the State. It appears that inability to capitalize on the natural production advantages of an area may at times be due to inadequate market facilities and lack of knowledge as to product requirements of large chain buyers. The South Carolina station is also investigating the market for factors used in production by South Carolina farmers.

E. Credit and Capital Needs of Marketing Firms

The Tennessee station is investigating the relationship of economic growth to capital formation in farm supply firms. The study will determine which method of cooperative financing has been most successful in terms of financial growth and strength of cooperative associations. Special attention will be given to problems of financial growth arising from State and Federal legislation, e.g. tax laws.

Only the State of Florida and some insurance companies have adopted a research approach approximating the work outlined above. Florida hired two agencies to make an analysis of the total economy in Florida to discover broad economic potentials. Various insurance companies study specific industries from the viewpoint of finding profitable loan opportunities. The Doane Agricultural Agency also conducted research of a more limited nature in this area.

It must be stressed that the research the Department is doing will result in general relationships or principles which then may be applied by communities or organizations within communities to the problems confronting them.

In sharp contrast, the research done by private groups described above, particularly by individual companies, is aimed at developing specific answers for that company alone and not for the public at large. Most companies make market structure and time and motion efficiency studies within their own firms but do not publish this information for public use. The same applies to the development of new market uses for particular commodities. Thus, while quite a bit of research is done by individual firms for specified private purposes, little is being done in the area that will be available for use by the public at large.

Some chambers of commerce have attempted to make serious studies but most of them have stressed the application of the results supplied by public groups to their community at large.

## REPORT OF PROGRESS OF USDA AND COOPERATIVE PROGRAMS

### A. Situation and Outlook

Recent trends in retail costs, farm values and farm-retail spreads for farm foods and in costs incurred by marketing firms were described in each issue of the Marketing and Transportation Situation. The Annual Outlook issue in October included a discussion of changes in farm-retail spreads, marketing costs, and profits during the year just ended and considered probable trends during the year ahead. It also included an article on competition in transport industries and an article describing food distribution programs of the U. S. Department of Agriculture. The February issue included articles on food retailing by discount houses and on recent changes and prospects among food marketing industries. The research, analysis, and preparation of the latter article on food marketing industries was done, in large part, under this project. The article reviews trends in number, average size and affiliation of processing plants and wholesale and retail outlets. The May issue of the Situation included articles on developments in the sugar industry, prices of intermediate goods and services purchased by agricultural marketing firms, and guides for improving promotional programs. The August issue contained articles which reviewed developments in the farm-food marketing bill, changes in concentration and ownership in food industries, problems of marketing food in Jamaica and recent developments in advertising expenditures. The article on concentration contained statistics showing post-World War II trends in concentration of market power among food marketing firms. The article on Jamaica described the Island's marketing system, its relation to farm production, and the role of agriculture and agricultural marketing in future economic development in Jamaica.

Thirteen of the articles in the Situation were reprinted and widely distributed. Some of these articles were reprinted in full or in part by trade publications. Additional work under this project included 4 pages of charts and tables and accompanying legends prepared for the Agricultural Outlook Chartbook.

### B. Marketing Information

Interest in prices, marketing costs and margins, profits, and other marketing data has continued strong. Many individual requests were answered for members of the Congress, Government officials, marketing firms, research workers, communications media, and others with information concerning the marketing of farm products. The Director of the Division presented a statement on developments in marketing spreads for agricultural products to the Subcommittee of the House Committee on Appropriations.

Tables showing estimates of the effect on retail prices and marketing charges of increases in farmers' prices were prepared for the Secretary's staff.

Appraisal of the use of marketing information by potato producers in Southern California revealed that most producers considered information adequate for their needs. There was a relationship between the degree to which information is searched out and degree producers engage directly in decisions.



### C. Cotton

Work is designed to determine the adequacy of present methods of establishing cotton quotations, the accuracy of quotations, and possible means of improvement. A report has been published describing in detail the organization, trading volumes, and operating practices in the 14 designated central markets. Marked variations among markets in the dependability of quotations were found and these were related to differences in numbers of buyers and sellers, in volumes handled, in wide ranges of qualities of cotton handled. Numbers of buyers range from only one in one market to more than 100 in another and the volume of trading in the largest market is about 450 times the volume in the smallest.

Among the suggestions for improvement in the system are: (1) A group of 3 (or 5) markets should be removed from the list of designated markets, (2) in computing the new 12 or 10 market average quotations weighted rather than simple averages should be used to give better geographic and market volume balance, (3) each committee should meet at least once a week, and (4) committees should be relieved of responsibility for quoting prices on grade-staple classifications not actually traded.

Preliminary analysis of sales data and price quotations indicates that average premiums and discounts quoted by the 14 designated markets are in line with actual premiums and discounts paid for the major qualities of cotton produced. For minor qualities (lower grades and shorter staples) the quotations were less accurate indicators.

### D. Eggs

Studies revealed ways to improve and develop market news reports on the volume of eggs moving into retail channels in large metropolitan areas. In February 1960, improved weekly reports were being issued to the public in Seattle, San Francisco, Los Angeles and Chicago, and a new report for the Portland-Vancouver metropolitan area was begun. These reports contain information on the weekly volume of eggs for each metropolitan area and comparisons with the previous week and the same week a year ago. The information for each area can be aggregated to obtain movements for all reporting areas.

Surveys of egg handling firms in 13 additional metropolitan areas have been completed the last two years. Weekly reports were released for the Philadelphia and Baltimore metropolitan area beginning in March 1961; for the New York and Boston areas in June 1961; for Pittsburgh in September 1961; Detroit in October 1961; Kansas City in January 1962; St. Louis and Atlanta in March 1962; and Birmingham and New Orleans in June 1962. Surveys designed to establish a universe of firms and planned reporting procedures have been completed for Minneapolis-St. Paul and Miami.

### E. Wool

Research is designed to determine the effects of classification and market information services on wool prices to producers and to ascertain the feasibility of providing such services. It is concerned with a fundamental weakness of the present system of marketing domestic wool, the lack

of adequate classification and market information services in producing areas. Data on 329 lots of wool sampled at warehouses in Southwestern Texas in 1957-59 and 115 lots sampled at warehouses in North Central and Western States in 1958-59 show that large proportions of quoted quality differentials at Boston were reflected in prices to producers of the lots for which a classification service was provided. Differences in yield, fineness, staple length, and crimp were among the most significant factors affecting the differences in prices.

During 1962, data on prices to producers and on laboratory determinations of quality for 104 lots of wool in New Mexico were assembled, in cooperation with the New Mexico Agricultural Experiment Station, and for 79 lots of wool at warehouses in North Central and Western States, in cooperation with Livestock Division, AMS. In addition, data on prices to growers and on subjective evaluation of a large volume of wool sold through warehouses in 9 Western States for the period April to August 1962 were assembled for evaluation of their use in improving market information services for wool.

#### F. Rural Areas Development

The contract with the University of Montana, which provided for study of off-farm employment opportunities which might result from the expansion of food processing in Western Montana, has been completed. The final report is in the hands of the printer.

This study involved not only investigation of six production counties but of the market areas where the goods are currently shipped. In each market 6 or 7 food and vegetable wholesalers, brokers, and chain store representatives were interviewed. This study was initiated partly upon the assumption that the two food chain marketing and processing plants which were greatly underemployed were off 5 weeks during the year might expand their operating period and work in greater capacity with diversification of production to be achieved.

Investigation at the lower level showed that marketing structure was sufficiently haphazard so that needed quality control of products is impossible under the present situation. Studies of requirements for either building a new processing plant or converting existing plants to potato processing show that economies of scale are such that a plant will not be feasible at the present time.

Climatic conditions favor production of alternative crops. Credit was determined to be readily available within the area but only for cherries and potatoes. Thus, absence of persons who are willing to borrow sufficient capital to generate an orderly production and processing system appears to be the primary impediment for economic development in this area.

Comparisons of economic growth for the period of 1900 to 1960 were made for Alabama, the Southern States (as an aggregate), and the Nation. In certain sectors like petroleum, coal products, wood products, lumber and primary materials, Alabama experienced a decline. This decline was of two parts-- that associated with regional competition, and that associated with a national decline of the industries in question. In the instance of lumber, wood products and primary materials interregional competition played the

lesser role. In the case of a national decline in food, textiles, and apparel, Alabama experienced increases which except for textiles were more than enough to offset the decline that would have been anticipated for Alabama, if Alabama had experienced the national growth rate of these industries. Unfortunately, an increase for Alabama and these sectors is not necessarily an advantage. It means that Alabama is expanding her economic plant and industries which show below-average national growth. It is questionable if Alabama will continue to grow in these sectors as they soon may reach a point before relative growth becomes impossible. In recent years within food products, Alabama meat and grain mill products show substantial growth in share of employment relative to the share of other areas for these industries. A closer look at meat products in terms of relative gains and losses shows possibilities for further growth in terms of the growth characteristics occurring at the national level. Such growth does not imply need for additional establishments as much as it suggests the opportunity of operating existing facilities at a level nearer capacity.



PUBLICATIONS REPORTING RESULTS OF USDA AND COOPERATIVE RESEARCH

Situation and Outlook

The Marketing and Transportation Situation. Quarterly 1960-62. ERS.

Marketing Information

Jessen, R. J., and Miklius, Walter. June 1962. Sources and uses of marketing information by potato growers in southern California. ERS-64.

Ogren, Kenneth E. 1962. Developments in marketing spreads for agricultural products in 1961. Statement before the Subcommittee of the Committee on Appropriations, House of Representatives, Eighty-Seventh Congress, Second Session.

Cotton

Soxman, R. C. June 1962. Official spot cotton quotations, where and how quoted. Mktg. Res. Rpt. 547.

Eggs

Pederson, John R., and Mitchell, William L. September 1961. Reporting shell egg movements into retail channels in four west coast cities. ERS-30.

Wool

Howell, L. D., and Faught, William A. July 1961. Wool classification service and prices to producers. Tech. Bul. No. 1247.

Rural Areas Development

None.

Line Project Check List -- Reporting Year October 1, 1960 to September 30, 1962

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Year	Line Project Incl. in Summary of: Progress (Yes-No)	Area & Subheading
ME 6				
ME 6-2	Evaluation of Methods of Distribution of Federally Donated Commodities Within States	Washington, D. C.	Yes	Area 1 A3
ME 6-3 2/ Dis. 5/62	Impact of the Plentiful Foods Program on School Lunch Food Purchases	Washington, D. C.	Yes	Area 1 B1
ME 6-4 1/	Surveys and Analyses of New Food Distribution Programs for Low-Income Households	Washington, D. C.	Yes	Area 1 A1
ME 6-5 1/	Surveys and Analyses of Effect of Food Stamp Operations on Sales of Food in Retail Outlets	Washington, D. C.	Yes	Area 1 A2
ME 6-6 1/	Market for Food in Public and Private Schools	Washington, D. C.	Yes	Area 1 B3
MD 4-7 2/ Dis. 2/61	Economic Evaluation of Methods of Increasing Consumption of Food of Low-Income Families	Washington, D. C.	Yes	Area 1 A4
MD 4-11 2/ Dis. 6/61	Analyses of the Potential Increase in School Feeding Programs	Washington, D. C.	Yes	Area 1 B2
1/	Projects conducted under transfer of funds Food Distribution Division, AMS.			
2/	Projects discontinued during reporting period.			

## Line Project Check List -- Reporting Years October 1, 1960 to September 30, 1962

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Years	Line Proj. Incl. in	
			Summary of Progress (Yes-No)	Area & Subheading
ME 1-22	Economic impact of innovations	Washington, D.C.	Yes	2-I-2
MD 2-5 1/	Development of new and expanded market outlets for inedible fats in feeds	Washington, D.C. & selected areas in U.S.	Yes	2-G-2
MD 2-13 1/	Development of new and expanded market outlets for fats and oils in plasticizers	Washington, D.C. & selected areas in U.S.	Yes	2-G-5
MD 2-14 1/	Effects of usage of inorganic nitrogen source compounds in mixed feeds on market potential for agricultural proteins	Washington, D.C. & selected areas in U.S.	Yes	2-D-5
ME 4-1	Market potentials for dialdehyde starch and/or its derivatives in industrial uses and as starting raw materials in chemical industry products	Washington, D.C.	No	-
ME 4-2	Super-concentrated (7-fold) fruit juices	Washington, D.C.	Yes	2-C-1
ME 4-3	Improved egg products in remanufacturing uses	Cambridge, Mass., Albany, Calif. & Washington, D.C.	Yes	2-F
ME 4-4	Effects of convenience foods on food prices	Washington, D.C.	Yes	2-I-1
ME 4-5 1/	Market potentials for cotton fibers and fabrics in cotton-reinforced plastic laminates	Washington, D.C. & selected areas in U.S.	Yes	2-B-3
ME 4-6	Market potential investigations for products from new crops for industrial, feed, food, or pharmaceutical use	Washington, D.C. & selected areas in U.S.	Yes	2-H-1
ME 4-7 1/	Market potentials for high-amylose-content cornstarches in industrial uses	Washington, D.C. & selected areas in U.S.	No	-
ME 4-8	Economic effects of nonscourable foreign materials in domestic wool on present and potential markets	Washington, D.C., Boston & S. Barre, Mass., Woonsocket, R.I. & WU-ARS, Albany, Calif.	Yes	2-B-1
ME 4-9	Study of the market potential for hides and skins in the leather industry	Washington, D.C. & selected areas in U.S.	Yes	2-E
ME 4-10	Market potentials for fats and oils and fatty acids in selected industrial use markets	Washington, D.C., Chicago, Ill., & selected areas in U.S.	Yes	2-G-3
ME 4-11 1/	Market potentials for processed potatoes	Washington, D.C.	Yes	2-C-3
ME 4-12	Market potentials for materials of agricultural origin in adhesives	Washington, D.C., Newark, N. J. & selected areas of U.S.	Yes	2-D-4
ME 4-13	Market potentials for frozen bakery products	Albany, Calif., Washington, D.C. & selected areas in U.S.	Yes	2-D-1
ME 4-14	Commercial possibilities of dehydrofrozen apple slices	Washington, D.C.	Yes	2-C-2
ME 4-15	Market potential for bulgur, unseasoned and pilaf	Washington, D.C.	Yes	2-D-2
ME 4-16	Market potentials for unextracted soybean meal in poultry feeds	Washington, D.C. & selected areas in U.S.	Yes	2-G-4
ME 4-17	Market potentials for Hawaii farm products	Honolulu, Hawaii	Yes	2-H-4
ME 4-18	Market potentials for hides and skins in alternative markets to leather	Washington, D.C.	Yes	2-E
ME 4-19	Market potential for modified edible fats and oils	Chicago, Ill., New Orleans, La. & Washington, D.C.	Yes	2-G-1
ME 4-20	Market potentials for interfacial polymerized wool in textiles	Washington, D.C. & selected areas in U.S.	Yes	

Continued-



## Line Project Check List -- Reporting Years October 1, 1960 to September 30, 1962 - Continued

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Years	Line Proj. Incl. in	
			Summary of Progress (Yes-No)	Area & Subheading
ME 4-21	Market potential for sweetpotato flakes in selected markets	Cleveland, O., New Orleans, La., & Washington, D.C.	Yes	2-C-4
ME 4-22	Market potentials for cereal grain starch products in new industrial uses	Washington, D.C.	Yes	2-D-6
ME 4-23	Market potential for low-fat fluid milk	Washington, D.C. & selected areas in U.S.	Yes	2-A-1
ME 4-24	Water soluble gums and mucilages other than starch	Washington, D.C.	Yes	2-H-2
ME 4-25	Processing and marketing maple syrup and other maple products	Washington, D.C.	Yes	2-H-3
ME 4-26	Distribution patterns of domestic and territorial rice market	Washington, D.C., & selected areas in U.S.	Yes	2-D-3

## Line Project Check List -- Reporting Year 10/1/60 to 9/30/63

Work & : Line : Project : Number :	Work and Line Project Titles	: : Work Locations: : During : : Past Year :	: : Summary of: : Progress : : (Yes-No) :	: : Line Project Incl. in : Area : & : Subheading
ME 5-1 2/	Surveys of Available Fresh Fruit & Fruit Produce	:Wash., D.C.	: Yes	: 3-F. & Veg.
ME 5-2	Use of In-Store Prom. Materials	:Wash., D.C. & : : N.Y., N.Y.	: Yes	: 3-Mult. Prod.
ME 5-3	Manual Prom. Procedures	:Wash., D.C. & : : Evanston, Ind.	: Yes	: 3-Mult. Prod.
ME 5-4	Eval. Prom. Programs for Frozen Orange : Concentrate	: : Wash., D.C.	: Yes	: 3-F. & Veg.
ME 5-5	Merchandising Practices Employed by : Restaurants for Dairy Products	: : Wash., D.C.	: Yes	: 3-Dairy Prod.
ME 5-6	Influence of Food Store Layout on Consumer : Shopping Behavior	: : Wash., D.C.	: Yes	: 3-Mult. Prod.
ME 5-7	Appraisal of Lamb Promotional Programs	:Wash., D.C.	: Yes	: 3-L.S. & L.P.
ME 5-8	Stat. Bulletin on Household Purchases of : Selected Juices	: : Wash., D.C.	: Yes	: 3-F. & Veg.
ME 5-9	Manual Prod. Merch. Practices	:Wash., D.C.	: No	:
ME 5-10	Evaluation of Long-Term Effect of Promotional : Programs for Citrus	: : Wash., D.C.	: Yes	: 3-F. & Veg.
ME 5-11	Sales Effect of Space Allocation, Plans in : Retail Stores (combined ME 5-15)	: : Wash., D.C.	: No	:
ME 5-12	Evaluation of Pear Prom. Programs	:Wash., D.C.	: Yes	: 3-F. & Veg.
ME 5-13	Consumer Acceptance of Apples Relative to : Percent of Red Color	: : Wash., D.C.	: Yes	: 3-F. & Veg.
ME 5-14	Inventory Control & Space Management in : Warehousing Agri. Comm.	: : Wash., D.C.	: Yes	: 6-N
ME 5-15	Inv. Control & Space Allocation in Retail : Food Stores	:Boston, Mass. : : & Wash., D.C.	: Yes	: 3-Mult. Prods.
ME 5-16	Trend Measurement & Oper. Efficiency in : Food Distribution	: : Wash., D.C.	: Yes	: 6-N
ME 5-17	Evaluation of Broiler Merchandising and : Prom. Programs	: : Wash., D.C.	: Yes	: 3-Poult. & Eggs
ME 5-18	Impact of Food Operation of Discount : Houses on Food Distribution	: : Wash., D.C.	: Yes	: 3-Mult. Prod.
ME 5-19	Food Stocks at Retail & Wholesale : (Civil Defense) 1/	: : Wash., D.C.	: Yes	: 3-Mult. Prod.
ME 5-20	Survey of Prom. Groups	:Wash., D.C.	: No	:
ME 5-21	Evaluation of Dairy Prom. Programs	:Wash., D.C.	: No	:
ME 5-22	Appraisal of Market Development for : Desert Citrus Industry	: : Wash., D.C.	: No	:
ME 5-23	Survey of Consumer Purchases of Fresh & : Processed Fruit Products in relation to : Consumer Characteristics	: : Wash., D.C.	: Yes	: 3-F. & Veg.
ME 1-11	Effect of Adv. & Prom on Cost of : Marketing	: : Wash., D.C.	: Yes	: 3-Mult. Prod.
MD 3-18 2/	Cummulative Effect of Prom. on Demand for : Lamb	: : Wash., D.C.	: No	:
MD 3-22 2/	Consumer Acceptance of Pork Cuts From Meat : & Fat Type Hogs	: : Wash., D.C.	: No	:
MD 3-31 2/	Effect of Various Promotional Themes on : Apple Sales	: : Wash., D.C.	: Yes	: 3-F. & Veg.
MD 3-33 2/	Consumer Acceptance of Natural Color and : Color Added Florida Oranges	: : Wash., D.C.	: Yes	: 3-F. & Veg.
MD 3-47 2/	Inv. Control and Space Alloc. in the : Grocery Department of Retail Food Stores	: : Wash., D.C.	: No	:
:	1/Project conducted with transfer of funds : from Dept. of Defense.	: :	:	:
:	2/Project Discontinued During Report Period.	: :	:	:

LINE PROJECTS -- October 1, 1960, Through September 30, 1962

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Years	Line Project Incl. In	
			Summary of: Progress : (Yes-No)	Area & Subheading
TF 3	(Work : Transportation costs and services and their Project): economic effect on agriculture			
TF 3-13	Bibliography of transportation of agricultural products, 1950-59 (terminated 10/5/61)	Washington, D. C.	No	
TF 3-15	Economic analysis of trends in transportation of grain in the North Central States (terminated December 1960)	Washington, D. C.	No	
TF 3-17	Containerized transportation of agricultural products (terminated 1/9/62)	Washington, D. C.	No	
ME 3-6	Economic impacts of the St. Lawrence Seaway on the marketing of agricultural products	Washington, D. C.	Yes	4-A-3
ME 7	(Work : Transportation costs and services and their Project): economic effect on agriculture (Formerly TF 3)			
ME 7-1	Economic research and consultation to meet current requests for information	Washington, D. C.		
ME 7-2	Development of statistics for the transpor- tation bill and rail freight rate indexes	Washington, D. C.	No	
ME 7-3	Transportation and Facilities Research Division cooperation in SM-11 project (rev.), transpor- tation of grain and grain products in the South	Washington, D. C.	No	
ME 7-4	Determination and analysis of costs of motor carriers engaged in the transportation of farm products	Washington, D. C.	Yes	4-A-2
ME 7-5	Determination and appraisal of the nature and scope of operations of exempt, for-hire carriers and truck brokers in the movement of agricultural commodities	Washington, D. C.	Yes	4-A-1
ME 7-6	Economic appraisal of the transportation of fresh fruits and vegetables from California and Arizona to interstate markets	Washington, D. C.	No	
ME 7-7	Alternative means to increase the flexibility and reduce the costs of railroad grain trans- portation services	Washington, D. C.	No	
ME 7-8	Analysis of economic possibilities of using air freight for moving agricultural commodities	Washington, D. C.	Yes	4-A-4
ME 7-9	The movement of exempt agricultural commodities in interstate commerce by private motor carriers	Washington, D. C.	No	
ME 7-10	Ocean freight rate series	Washington, D. C.	No	
ME 7-11	Economic analysis of trends in the transpor- tation of grain in the Northwest and	Washington, D. C. Bozeman, Montana	No	
ME 7-12	Economic analysis of the grain transportation system in the Southwest	Washington, D. C.	No	



## Line Project Check List -- Reporting Yearing October 1, 1961 to September 30, 1962

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Year	Line Project Incl. in	
			Summary of Progress	Area & Sub- Subheading
ME 2	Economics of marketing farm animals and animal products			
ME 2-17	Factors affecting the variability of butterfat tests from selected sampling routines for producers in selected Federal order markets for a 12-month period	Washington, D.C.	Yes	5-A-1
ME 2-20	Economic effects of distribution of meats by U.S. grades	Washington, D.C.	Yes	5-B-1
ME 2-30	Effects of live animal and carcass shrinkage on pricing cattle and hogs	Fort Collins, Colo.	Yes	5-B-4
ME 2-33	Research for improved live hog and carcass pricing and grading	Washington, D.C.	Yes	5-B-2
ME 2-36	Relation of quality factors in butter to price and demand	Washington, D.C.	Yes	5-A-2
ME 2-38	An economic analysis of methods of determining protein and solids-not-fat content as a basis for purchasing milk	Davis, Calif.	Yes	5-A-3
ME 2-40	Estimation of grade composition of market hogs	Washington, D.C.	Yes	5-B-3
ME 2-49 <u>1/</u>	Procedures, marketing costs, and effects on maintenance of egg quality from laying house to consumer	Washington, D.C.	Yes	5-C-1
ME 3	Economics of marketing farm crops			
ME 3-13	Economic evaluation of cotton quality	Washington, D.C. Stoneville, Miss. Clemson, S.C. Raleigh, N.C.	Yes	5-D-1
ME 3-19	Changes in quality and value of cotton bales and cotton samples during storage	Washington, D.C. Stoneville, Miss. Tucson, Ariz.	Yes	5-D-2
ME 3-41	Marketing Economics Division cooperation on regional research project WM-41 on influence of recent technological developments on the marketing and market acceptance of Western cotton	Tucson, Ariz.	Yes	5-D-2
ME 3-49 <u>2/</u>	An economic evaluation of grade and size standards for mature green tomatoes	Gainesville, Fla.	Yes	5-E-1
ME 3-58	An economic evaluation of alfalfa hay grading	Washington, D.C.	Yes	5-F-1
ME 3-74 <u>1/</u>	Feasibility of marketing radiation pasteurized fresh strawberries, peaches, citrus, grapes, and tomatoes	Washington, D.C.	Yes	5-E-2
ME 3-82 <u>1/</u>	Tobacco quality and the pricing system	Washington, D.C.	Yes	5-G-1

1/ Initiated during reporting year.2/ Discontinued during reporting year.

Line Project Check List -- Reporting Year October 1, 1960 to September 30, 1962

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Year <sup>1/</sup>	Line Project Incl. in Summary of Progress (Yes-No)	
			Area & Subheading	
ME 2-3	Quarterly measurement and analysis of costs, margins, and efficiency for 80 selected fluid milk processing and distributing plants.		Yes	6-A
ME 2-9	Impact of seasonality of milk production on labor efficiency in plants manufacturing dairy products.	Lafayette, Ind.	Yes	6-A
ME 2-18*	Economic appraisal of bulk vs. can assembling of milk.		No	
ME 2-29	Establishing guides for efficient organization of the dairy industry under changing conditions in the South.	Experiment, Ga.	Yes	6-A
ME 2-42**	Flexibility in dairy products manufacturing plants.		No	
ME 2-45**	A study of the capacity and flexibility of facilities in milk manufacturing plants.	St. Paul, Minn.	No	
ME 2-47**	Marketing margins for fluid milk.		No	
ME 2-5*	Development of improved costing procedures for poultry slaughtering plants.		Yes	6-B
ME 2-6*	Margins, costs, and trade practices in marketing frying chickens, eggs, and turkeys in the North-eastern States.		Yes	6-B
ME 2-7	Economic requirement for development of a commercial egg industry in the South.	Athens, Ga.	Yes	6-B
ME 2-10	Commercial hatchery costs, operations and trends.		Yes	6-B
ME 2-11*	Cost and practices in procuring and assembling eggs from farms.		Yes	6-B
ME 2-12	Cost and economies of scale in assembling and processing turkeys.		Yes	6-B
ME 2-13	Improving the efficiency of poultry marketing in New England.	Durham, N. H.	Yes	6-B
ME 2-14	An economic appraisal of the competitive position of the South in marketing eggs and broilers.	Knoxville, Tenn.	No	
ME 2-15	Coordinated egg production-marketing programs and new marketing technology.		No	
ME 2-26	Adjustments needed in marketing Northeastern poultry products.	Durham, N. H.	No	
ME 2-4	Costs and margins for marketing livestock, meats, and meat products.		Yes	6-C
ME 2-23*	Improving the pricing and operational efficiency of wholesale meat distribution.		Yes	6-C
ME 2-35	Factors affecting the efficiency of livestock marketing in the Northeast.	Morgantown, W. Va.	No	
ME 3-64**	Costs of curing hides.	Columbus, Ohio	Yes	6-C
ME 3-1	Charges and practices in marketing cotton.		Yes	6-D
ME 3-3	Marketing margins and costs for fibers and textiles.		Yes	6-D
ME 3-7*	Regional research on effects of fire prevention devices and practices on insurance and related costs.	Tucson, Ariz.	Yes	6-D
ME 3-55	Cotton ginning efficiency and cost.	Stoneville, Miss.	Yes	6-D
ME 3-79**	Cost and efficiency of warehousing and related services for cotton.		No	
ME 3-45	Feasibility of grading, sorting, scouring, and baling wool in producing areas.	Columbus, Ohio	No	
ME 3-56*	Price risks for wool.		Yes	6-E
ME 3-60**	Organization, operation, and efficiency of wool pools.		No	

Continued --

<sup>1/</sup> Washington, D. C., unless otherwise indicated.

\* Discontinued during the reporting period.

\*\* Initiated during the reporting period.

## Line Project Check List -- Reporting Year October 1, 1960 to September 30, 1962--Continued

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Year <u>1/</u>	Line Project Incl. in	
			Summary of Progress (Yes-No)	Area & Subheading
ME 3-10	Analyzing price spreads, margins, and costs for grain and feed products.		Yes	6-F
ME 3-35	Study of the market organization, plant volume, practices and efficiency in the rice milling industry.		No	
ME 3-51*	Analysis of market news reporting and price spreads for formula feeds in the Georgia-Alabama broiler area.		No	
ME 3-63**	Cost and efficiency of grain storage and handling in the spring wheat area.	Bozeman, Mont.	No	
ME 3-68**	Costs and efficiencies in bread distribution.	Berkeley, Calif.	No	
ME 3-78**	Cost of operating grain elevators.		No	
ME 3-12*	Costs and efficiency in operating alfalfa dehydrating plants.	Manhattan, Kans.	Yes	6-G
ME 3-15**	Cost and efficiency in the operation of feed mixing plants.		Yes	6-G
ME 3-25	Costs and efficiencies of commercial seed processing plants.	Corvallis, Oreg.	Yes	6-G
ME 3-65**	Impacts of grain banks on feed milling and farming.	Lafayette, Ind.	Yes	6-G
ME 3-9*	Costs of marketing fresh citrus fruits grown in Florida and Texas.	Gainesville, Fla.	Yes	6-H
ME 3-5*	Marketing costs and practices for peaches.		Yes	6-I
ME 3-11*	Costs and efficiency in marketing Eastern apples.		Yes	6-I
ME 3-20	Costs of handling, packing, and distributing pears.	Berkeley, Calif.	Yes	6-I
ME 1-1	Measurement of components of farm-to-retail price spreads for selected food commodities on a continuing basis.		Yes	6-I
ME 3-38*	An economic evaluation of opportunities for vegetable processing in the South.	Raleigh, N. C.	Yes	6-J
ME 3-2*	Costs, margins, and efficiency as affected by different methods of marketing sugar.		Yes	6-K
ME 3-26*	Analysis of market organization and practices in marketing bulk and bag raw sugar.		Yes	6-K
ME 3-62**	Costs and margins in marketing sugar as affected by changing practices.		No	
ME 3-16*	Effects of equipment modifications on relative efficiency of screw-press cottonseed oil mills.		No	
ME 3-17*	Analysis of power and labor utilization and other costs in flaxseed processing.		No	
ME 3-18*	Marketing margins and costs for soybean and cottonseed oils in margarine.		Yes	6-L
ME 3-36*	Economic analyses of improved methods and practices for handling farmers stock peanuts.		Yes	6-L
ME 3-46*	Economic evaluation of improved equipment and methods for the rapid measurement of soybean oil and moisture content applied to soybean grading and pricing.		No	
ME 3-69**	Costs and practices of peanut shellers.		Yes	6-L
ME 3-70**	Labor utilization at cottonseed oil mills.		No	
ME 3-71**	Marketing margins and costs for peanuts in peanut butter.		Yes	6-L
ME 3-80**	Sheller margins and market patterns for peanuts.		No	
ME 3-81**	Economic evaluation of the commercial utilization pattern for peanuts at the sheller level.	Raleigh, N. C.	No	
ME 3-84**	Marketing margins for fats and oils in selected consumer products.		No	
ME 3-4	Margins and costs for tobacco leaf and tobacco products.		Yes	6-M

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Line Project Check List -- Reporting Year October 1, 1960 to September 30, 1962--Continued

Work & Line Project Number	Work and Line Project Titles	Work Locations During Past Year <u>1</u>	Line Project Incl. in	
			Summary of Progress (Yes-No)	Area & Subheading
ME 3-22	Costs and efficiency of looseleaf tobacco auctions.	Lexington, Ky.	No	
ME 3-24	The organization costs and efficiency of tobacco redrying plants.		Yes	6-M
ME 3-34*	Economic analysis of technological changes as they affect the marketing of leaf tobacco.		Yes	6-M
ME 1-2*	Cost and efficiency in wholesaling frozen foods.		No	
ME 1-3*	An economic appraisal of the effect of changing technology and services on marketing costs and margins of food products.		Yes	6-N
ME 1-5	Extent and effects of labor practices and provisions on the costs, adequacy, and structure of agricultural marketing.		Yes	6-N
ME 1-13	Farm-to-retail price spreads, the marketing bill, and other statistics on entire marketing process.		Yes	6-N
ME 1-16	Measurement of input-output relationships in farm food marketing.		Yes	6-N
ME 5-14	Economics of inventory control and space management in warehousing agricultural commodities.		No	
ME 5-16	Development of standards of performance and trend measurement of operating efficiency in food distribution.		Yes	6-N

## LINE PROJECT CHECK LIST -- Reporting Year October 1, 1960, through September 30, 1962

Work and line project number	Work and line project titles	Work locations during past year	Line project incl. in	
			Summary of progress (Yes-No)	Area and subheading
ME 1-7	Patterns of growth and change in the structure of agricultural marketing and supply industries and their probable economic consequences	Lincoln, Nebraska Stillwater, Okla. Madison, Wisconsin Washington, D. C.	Yes	7-A
ME 1-8	Potential adjustments in marketing costs, organization and practices resulting from the marketing of food preserved by atomic radiation	Washington, D. C.	No	
ME 1-9	Magnitude and economic consequences of sales of nonfood items in retail grocery stores	Lafayette, Indiana Washington, D. C.	Yes	7-A
ME 1-10	Economic importance of taxes in the marketing of agricultural commodities	Washington, D. C.	Yes	7-A
ME 1-19	Pricing practices of food firms of selected products	Washington, D. C.	Yes	7-A
ME 1-20	Profits of agricultural marketing firms and their relationship to prices, market structure, and performance	Washington, D. C.	Yes	7-A
ME 1-21	Effects of selected Federal regulatory and service activities on the market structure, conduct, and performance of agricultural marketing and processing industries	Washington, D. C.	Yes	7-B
ME 2-1	Evaluation of present and alternative methods of establishing quotations and reporting egg prices	Washington, D. C.	Yes	7-H
ME 2-2	Marketing Economics Division cooperation in NCM-12 project, "Adapting Dairy Marketing Systems and Practices to Changing Utilization and Technology"	Urbana, Illinois	Yes	7-C
ME 2-8	Characteristics and impact of retail price wars in city milk markets	Washington, D. C.	Yes	7-C
ME 2-16	Marketing and pricing of milk used for other than fluid purposes in Missouri, Kansas, and Oklahoma markets	Washington, D. C.	Yes	7-C
ME 2-19	Economic analysis of changing locations of live- stock slaughter and meat processing	Ames, Iowa	Yes	7-G
ME 2-21	An appraisal of pooling in relation to changing supply and demand conditions in fluid milk markets	Washington, D. C.	No	
ME 2-22	Price behavior and price relationships among country and terminal markets for hogs	Washington, D. C.	Yes	7-G
ME 2-23	Improving the pricing and operational efficiency of wholesale meat distribution	Washington, D. C.	Yes	7-G

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LINE PROJECT CHECK LIST -- Reporting Year October 1, 1960, through September 30, 1962 (Cont.)

Work and line project number	Work and line project titles	Work locations during past year	Line project incl. in	
			Summary of progress (Yes-No)	Area and subheading
ME 2-24	An evaluation of the economic effects of recent developments in feeding, selling, and pricing slaughter livestock	Tucson, Arizona	Yes	7-G
ME 2-25	Marketing of products of class III milk in the New York milkshed	Washington, D. C.	Yes	7-C
ME 2-27	Managerial decision making and procurement policies in selected South Dakota dairy plants	Brookings, S. Dak.	Yes	7-C
ME 2-28	Impact of changing market structure on marketing of fluid milk in Oregon	Corvallis, Oregon	Yes	7-C
ME 2-31	Marketing Economics Division cooperation in SM-23 project, "An Analysis of Livestock and Meat Movements in the Southern Region"	Raleigh, N. C.	Yes	7-G
ME 2-32	Marketing Economics Division cooperation in western regional projects on economic analysis of competitive relationships between livestock markets and marketing channels in the West, WM-37 and WM-39	Denver, Colorado, & Ag. Exp. Stations of Western States and Texas	Yes	7-G
ME 2-34	Evaluation of possible economic bases for marketing orders for turkeys and chickens	Washington, D. C.	Yes	7-H
ME 2-37	The effect of specialized dairy product outlets on the dairy industry in selected markets of the western region	Berkeley, Calif.	Yes	7-C
ME 2-39	An evaluation of the competitive position and potential of the Texas-Oklahoma area in marketing and distribution of livestock and meat	Stillwater, Okla.	No	
ME 2-41	Marketing Economics Division cooperation in NCM regional project entitled, "Adjustments in Livestock Marketing in the North Central Region to Changing Patterns of Production and Consumption"	Ames, Iowa, and St. Paul, Minnesota	Yes	7-G
ME 2-43	Procurement policies and practices of large volume distributors of eggs	Washington, D. C., University Park, Pa., Columbus, Ohio	Yes	7-H
ME 2-46	Economics of long distance movement of bulk milk	Washington, D. C.	Yes	7-C
ME 2-48	Marketing Economics Division cooperation in NCM-12 project "Adapting Dairy Marketing Systems and Practices to Changing Utilization and Technology"	Urbana, Illinois	Yes	7-C
ME 2-50	Pricing and marketing milk used for other than fluid purposes in fluid milk markets	Washington, D. C.	Yes	7-C
ME 2-51	Bibliography of selected subjects in marketing of livestock, meat, and meat products	Washington, D. C.	No	

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LINE PROJECT CHECK LIST -- Reporting Year October 1, 1960, through September 30, 1962 (Cont.)

Work and line project number	Work and line project titles	Work locations during past year	Line project incl. in	
			Summary of progress (Yes-No)	Area and subheading
ME 2-52	Market structure and pricing in the livestock industries	Ames, Iowa,	Yes	7-G
ME 3-8	Economic factors in organization and location of western fruits and vegetable freezing plants	Berkeley, Calif. & Washington, D. C.	Yes	7-E
ME 3-14	Competition in the marketing of grapefruit--a phase of Southern Regional Citrus Project (SM-4): "The Economic efficiency of marketing Florida, Puerto Rico and Texas Citrus Fruit"	Gainesville, Fla.	Yes	7-E-1
ME 3-21	Analysis of marketing practices, costs, and margins of hides, skins, and pelts as related to uses of leather and leather products	Washington, D. C.	Yes	7-I-2
ME 3-23	Industry structure and costs of storing sorghum grains in commercial elevators	Washington, D. C., College Station, Texas	Yes	7-F
ME 3-27	Improving market organization and practices for refined sugar	Washington, D. C.	Yes	7-I-4
ME 3-28	Problems and economic considerations in modifying the bale wrappings for American cotton	Washington, D. C.	Yes	7-D-1
ME 3-29	Organization and practices of auction markets and warehouses in the marketing of cigarette tobacco	Washington, D. C.	Yes	7-I-5
ME 3-30	To determine changes in structure of wholesale fruit and vegetable markets	Washington, D. C., Berkeley, Calif., & Kansas City, Mo.	Yes	7-E
ME 3-31	A study of hedging practices and futures contracts for hard spring wheat	Washington, D. C., & Bozeman, Montana	Yes	7-F
ME 3-32	Industry organization and marketing practices for dried fruits	Washington, D. C.	Yes	7-B
ME 3-37	Organization and practices in the processing market for potatoes and the impact on the structure of the fresh potato market	Moscow, Idaho	Yes	7-E-2
ME 3-39	The economics of marketing hay and feed grains in the West cooperative with WM-20	Washington, D. C., & Western Region	Yes	7-F
ME 3-40	Impact of vine ripened (pink) tomato production on the Florida tomato market	Gainesville, Fla., & selected terminal markets of the eastern U. S.	Yes	7-E
ME 3-43	An evaluation of the competitive position of sucrose and nonsucrose sweeteners	Washington, D. C.	No	
ME 3-44	Analysis of channels of trade for U. S. grain from farm to consumer	Washington, D. C.	Yes	7-F

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LINE PROJECT CHECK LIST -- Reporting Year October 1, 1960, through September 30, 1962 (Cont.)

Work and line project number	Work and line project titles	Work locations during past year	Line project incl. in	
			Summary of progress (Yes-No)	Area and subheading
ME 3-47	Long-run demand and the effect of changes in demand and population on processing and marketing services and costs	Washington, D. C.	No	
ME 3-48	Changes in the American fats and oils industry-- structure, facilities, costs, and competition	Washington, D. C.	Yes	7-I-1
ME 3-50	Market structure and practices of the pecan industry	Washington, D. C.	Yes	7-I-3
ME 3-52	Improvements in handling and preparing wool at warehouses	Washington, D. C., College Station, Texas	Yes	7-D-2
ME 3-53	The impact of technological change on the structure and organization of the California deciduous fruit industry--a phase of WM-43	Berkeley, Calif., Washington, D. C.	Yes	7-E
ME 3-54	An economic evaluation of processing as a market outlet for vegetables in the Southeast	Experiment, Ga.	Yes	7-E
ME 3-57	Long-term trends in the demand and supply of sugar and competitive sweeteners and their effect on processing and marketing costs and services	Washington, D. C.	Yes	7-I-4
ME 3-59	"Eastern" beet sugar marketing problems	Washington, D. C., East Lansing, Mich.	Yes	7-I-4
ME 3-61	Pricing cotton in relation to fiber properties	Washington, D. C., & Texas	Yes	7-D-1
ME 3-66	Costs, prices, and competition in red tart cherry industry	East Lansing, Mich.	Yes	7-E
ME 3-67	Structure and performance of the lower Rio Grande Valley fruit and vegetable market	Washington, D. C., & lower Rio Grande Valley of Texas	Yes	7-E
ME 3-72	Changes in the structure and performance of the California fruit and vegetable markets	Davis, California	Yes	7-E
ME 3-73	Feasibility of cotton fabrics as bagging for American cotton	Washington, D. C., Plains area of Texas, New Orleans	Yes	7-D-1
ME 3-75	Economic analysis of the structure and performance of the Red River Valley potato market	Red River Valley, Minn., N. Dak., & Washington, D. C.	No	
ME 3-76	Competitive relationships in marketing citrus products	Gainesville, Fla., & Grand Rapids, Mich.	Yes	7-E-1
ME 3-77	Study of Canadian tobacco auctions	Guelph, Ontario	No	

LINE PROJECT CHECK LIST -- Reporting Year October 1, 1960, through September 30, 1962

Work and line project number	Work and line project titles	Work locations during past year	Line project incl. in	
			Summary of progress (Yes-No)	Area and subheading
ME 1-6	Role of agricultural marketing and other industrial firms in supplying additional employment and higher incomes for residents of low-income farm areas	Washington, D. C.: Bozeman, Montana	Yes	8-F
ME 1-12	Marketing situation and outlook reports	Washington, D. C.	Yes	8-A
ME 1-14	Appraisal of uses made of and needs for marketing information	Washington, D. C.	Yes	8-B
ME 1-15	Providing statistical and economic information relating to the marketing of agricultural products	Washington, D. C.	Yes	8-A
ME 2-44	Appraisal and development of reports on egg movement into retail channels	Washington, D. C.	Yes	8-D
ME 3-33	Influence of classification and market information services on wool prices to producers	Washington, D. C., Texas, North Cen- tral & Western States	Yes	8-E
ME 3-42	Central market quotations for cotton and factors affecting their adequacy	Washington, D. C.	Yes	8-C





